C21.5: 952/3

Vol. 952 Number 3

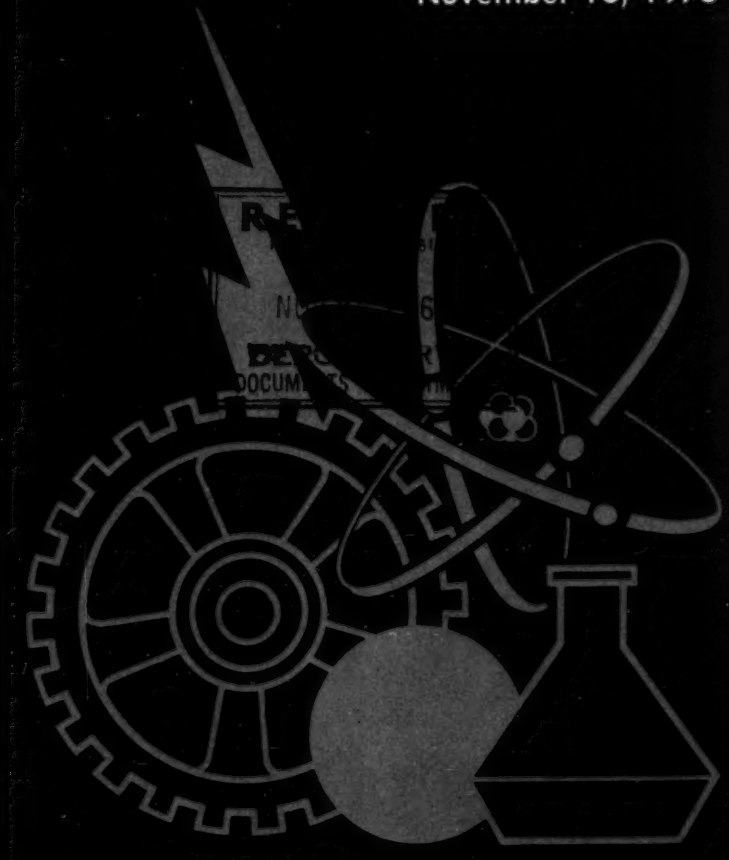
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 16, 1976



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 16, 1976 Volume 952 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

Certificate of Mailing Procedures

The Patent and Trademark Office has promulgated new Rules 1.8 and forms 3.55 and 4.23 which establish a new Certificate of Mailing Procedure, effective November 1, 1976.

In order to assist the Patent and Trademark Office in the effective handling of these certificates, the following buidelines are suggested.

Location of Certificate

The preferred location for the Certificate of Mailing is at the end of any correspondence mailed to the Office. In those situations where the certificate accompanies a fee or other form such as the issue fee transmittal form PTO–85, which does not have space for a certificate, the certificate should appear on a separate cover letter which refers to the accompanying paper. When a separate cover letter is used, a clear identification of the type of correspondence should be included.

Although not specifically required by the rule, it is preferred that the certificate be signed by the applicant, assignee, or attorney. The certificate should be signed separately from the correspondence itself. Suggested wording of the certificate is set forth in form 3.55 for patent cases and form 4.23 for trademark cases.

A separate certificate should be made for papers filed in each individual application, if papers for several different applications are mailed in a single envelope.

The phrase "prior to expiration of the set period" in 37 CFR 1.8(a) includes the last day of the set period.

WILLIAM FELDMAN,
Oct. 26, 1976. *Deputy Assistant Commissioner for Patents.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,611,313, Sharpless and Eichert, Jr., MAGNETIC DATA STORAGE SYSTEM, **filed** Aug. 25, 1967, D.C., N.D. Ill. (Chicago) Doc. 71c1082, *Technitrol Inc.* v. *Collins Radio Co.* Plaintiff's motion to dismiss is granted without prejudice as to infringement damages, Apr. 21, 1976.

2,906,875, E. T. Molinaro, STATION SAMPLING RADIO, **filed** Apr. 21, 1975, D.C. Del. (Wilmington) Doc. 75–103, *Edward T. Molinaro and Anthony P. Catanzaro* v. *Radio Corporation of America, Motorola, Inc. and Midland Corp.*

2,939,738, R. J. Lyons, SUPPORT MEANS FOR HINGED COVERS, **filed** June 2, 1976, D.C. Del. (Wilmington) Doc. 76–186, *The Bilco Co. and Orbert J. Lyons* v. *Potomac Iron Works, Inc.*

3,045,863, W. J. De Chelbor, BOTTLE CARRYING CASE; **3,178,052,** K. W Bromley, CARRYING CASES FOR BOTTLES; **Re. 25,767,** W. J. De Chelbor, PLASTIC CARRYING CASE FOR BOTTLES, **filed** June 30, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV76–2082–WPG, *Scepter Manufacturing of California, Inc. et al.* v. *United States Steel Corp.*

3,055,988, B. B. Bauer, MAGNETIC PHONOGRAPH PICKUP; **3,077,521,** Ahrens, Kuhn. and Richter, STEREOPHONIC MOVING MAGNET PHONOGRAPH PICKUP; **3,077,522,** Gunter and Anderson, STEREOPHONIC PICKUP CARTRIDGE, **filed** May 10, 1976, D.C. Colo. (Denver) Doc. 76–W–493, *Shure Brothers, Incorporated* v. *Music Discount.* **Same, filed** May 11, 1976, D.C., N.D. Calif. (San Francisco) Doc. C–76–964 SW, *Shure Brothers, Incorporated* v. *Tower Records, Inc.* **Same, filed** May 13, 1976, D.C. Md. (Baltimore) Doc. HM76–722, *Shure Brothers, Incorporated* v. *Peeltone Incorporated.*

3,077,521. (See 3,055,988.)

3,077,522. (See 3,055,988.)

3,079,903, J. W. Humphreys, HYDRAULIC TAPPET; **3,263,669,** W. H. Ashley, WAFERING MACHINE, **filed** June 21, 1976, D.C. Del. (Wilmington) Doc. 76–200, *Meyer & Burger* v. *Varian Associates, Inc.*

3,123,837, Paine, Johnson, Mauch and Sells, FOLDABLE BED FRAME, **filed** May 25, 1976, D.C., M.D.N.C. (Greensboro) Doc. C–76–248–S., *Lear Siegler, Inc.* v. *National Bed Frames, Inc.*

3,144,108, H. C. Reynolds, IMPACT WRENCH WITH SEPARATE INERTIA MEANS, **filed** Mar. 23, 1976, D.C. Fla. (Miami) Doc. 76–353–C–JE, *Ingersoll-Rand Company, Inc.* v. *Jule Mark and Dave Brodsky.*

3,165,811, Kleimack, Loar and Theuerer, PROCESS OF EPITAXIAL VAPOR DEPOSITION WITH SUBSEQUENT DIFFUSION INTO THE EPITAXIAL LAYER, **filed** Apr. 21, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1476, *Western Electric Company, Inc.* v. *Euro Electronics, Inc. and Allgemeine Elektrizitats-Gesellschaft-AEG Telefunken.*

3,175,317, R. J. Slavsky, IDENTIFICATION TAG, **filed** May 13, 1976, D.C. (District of Columbia) Doc. 76–0831, *Godfrey Bloch* v. *C. Marshall Dann et al.*

3,178,052. (See 3,045,863.)

3,211,167, Clift and Snyder, APPARATUS FOR TRANSPORTING SEWAGE AND WASTE LIQUIDS, **filed** Apr. 23, 1976, United States Court of Claims (Washington, D.C.) Doc. 163–76, *Julia Ann Clift* v. *The United States.*

3,250,189, H. Peletz, CATCH BASIN, **filed** Mar. 30, 1976, D.C. Oreg. (Portland) Doc. 76–298, *Santa Rosa Cast Products Company* v. *Walter Langeliers, doing business as Walt's Concrete and Concrete Curb Inlets Co.*

3,263,669. (See 3,079,903.)

3,293,405, R. J. Costanzo, ELECTRICALLY HEATED FOOTWEAR, **filed** Mar. 16, 1967, D.C. Conn. (New Haven) Doc. 11864, *Timely Products Corporation and Raphael J. Costanzo* v. *Stanley Arron, Patricia Sulzyski, Barbara Cherevenak and Visa-Therm Products, Inc.* Amended judgment entered after remand from the United States Court of Appeals. Judgment entered on Sept. 9, 1974, amended to award damages to the plaintiff against defendant Arron, and adjudging the Costanzo patent invalid insofar as claim 2 is concerned, Apr. 21, 1976.

3,368,811, B. B. Finney, INTERLOCKING GLOVE AND HANDLE, **filed** July 24, 1972, United States Court of Claims (Washington, D.C.) Doc. 297–72, *Basil B. Finney* v. *The United States.* Order patent held not infringed, Apr. 16, 1976.

3,371,588, F. C. Tambling, PHOTOCOMPOSING MACHINE; **3,382,963,** Cralle and Slaughter, PRINTING APPARATUS WITH NO-PRINT FEATURE, **filed** May 25, 1976, D.C., N.D. Ohio (Akron) Doc. C76–155A, *Frederick C. Tambling* v. *International Business Machines Corp., doing business as IBM.*

3,382,963. (See 3,371,588.)

3,424,524, Akiyama and Stockwell, MICRO-IMAGE DISPLAY APPARATUS, **filed** June 30, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c2122, *NCR Corporation* v. *Eastman Kodak Co.* Judgment entered in favor of defendant and against plaintiff and cause hereby dismissed, Apr. 19, 1976.

3,507,618, Murtv and Florey, APPARATUS AND METHOD FOR DETERMINING THYROID FUNCTION, **filed** Apr. 15, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–1230–WPG, *E. R. Squibb & Sons, Inc.* v. *Curtis Laboratories, Inc.*

3,576,061, G. Pahlitzsch, CIRCULAR SAWS WITH FACETED TEETH; **3,619,880,** same, CIRCULAR SAW BLADES OR SIDE-MILLING CUTTERS WITH TEETH OF FACET DESIGN, **filed** May 7, 1976, D.C., W.D. La. (Shreveport) Doc. 76–480–C, *Lear Siegler, Inc.* v. *Wallace-Murray Corporation.*

3,619,880. (See 3,576,061.)

3,644,051, A. H. Shapiro, TURBO-MOLECULAR AND STATOR PUMP HAVING IMPROVED ROTOR CONSTRUCTION, **filed** June 23, 1976, D.C., N.D. Calif. (San Francisco) Doc. C–76–1281–CBR, *Sargent-Welch Scientific Company* v. *Industrial Vacuum Engineering.*

3,737,513, Wiewiorowski and Miller, RECOVERY OF URANIUM FROM AN ORGANIC EXTRACTANT BY BACK EXTRACTION WITH H_3PO_4 OR HF, **filed** Sept. 4, 1975, D.C., M.D. Fla. (Tampa) Doc. 75–637–C–T–K, *Freeport Minerals Company* v. *Uranium Recovery Corporation.* Stipulation for dismissal; order granting same without prejudice, Apr. 9, 1976.

3,739,911, W. D. Patch, POOL-LESS AUGER-SEPARATOR FOR MATERIALS OF DIFFERING SPECIFIC GRAVITIES, **filed** July 20, 1976. D.C., N.D. Okla. (Tulsa) Doc. 76–C–392–B, *William D. Patch* v. *Four Star Mining Company.*

3,789,210, Weber, Shroyer and Baker, RECESSED LIGHTED ASSIST BAR, **filed** July 3, 1974, D.C., C.D. Calif. (Los Angeles) Doc. 74–1857–FW, *Progressive Dynamics, Inc.* v. *Building Components, Inc.* Filed judgment upon stipulation and order thereon that plaintiff's claim is good and valid, that defendant has infringed on plaintiff's patent and that defendant be permanently enjoined from further use, etc. of plaintiff's patent, entered Jan. 3, 1975.

3,937,167, W. H. Warren, METHOD FOR UNLOADING AND TRANSFERRING EGGS, **filed** July 20, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–2312–RMT, *Henningsen Foods, Inc.* v. *Food Engineering Service et al.*

3,956,008, Knepper, Arnheim III and Grenner, LIQUID COLORANT DISPERSIONS FOR PLASTICS, **filed** June 14, 1976, D.C., M.D.N.C. (Greensboro) Doc. C–76–276–G, *Inmont Corporation and Karl Finke, OHG* v. *Color Chip Corporation of North Carolina and Neil R. Wright.*

Re. 25,707. (See 3,045,863.)

D. 221,713, P. Kates, UMBRELLA, **filed** Nov. 24, 1971, D.C., S.D.N.Y., Doc. 71–C–5146, *Giant Umbrella Company, Inc.* v. *Associated Dry Goods Corp.* Filed order dismissing action with prejudice, June 7, 1972. **Same, filed** Nov. 24, 1971. D.C., S.D.N.Y., Doc. 71–C–5147, *Giant Umbrella Company, Inc.* v. *R. H. Macy & Company, Inc.* Filed consent order of discontinuance with prejudice, Oct. 31, 1973. **Same, filed** Nov. 24, 1971, D.C., S.D.N.Y., Doc. 71–C–5148, *Giant Umbrella Company, Inc.* v. *Lane Bryant, Inc.* Filed consent and order of discontinuance with prejudice, Oct. 31, 1973. **Same, filed** Nov. 24, 1971, D.C., S.D.N.Y., Doc. 71–C–5149, *Giant Umbrella Company, Inc.* v. *Bergdorf & Goodman Company, Inc.* Filed consent and order of discontinuance with prejudice, Oct. 31, 1973. **Same, filed** Nov. 24, 1971, D.C., S.D.N.Y. Doc. 71–C–5150, *Giant Umbrella Company, Inc.* v. *B. Altman & Company, Inc.* Filed notice of voluntary dismissal, June 2, 1972. **Same, filed** May 16, 1972, D.C., S.D.N.Y., Doc. 72–C–2087, *Giant Umbrella Company, Inc.* v. *Kanematsu Gotshu, Inc.* Filed plaintiff's voluntary dismissal, June 2, 1972.

PATENT NOTICES

Certificates of Correction for the Week of Nov. 16, 1976

Re. 28,822	3,935,685	3,963,707	3,974,673
Re. 28,852	3,936,410	3,963,762	3,974,838
D. 241,570	3,936,510	3,964,388	3,974,996
3,581,297	3,937,746	3,964,906	3,975,604
3,588,324	3,938,226	3,964,928	3,975,693
3,725,089	3,942,200	3,965,208	3,976,018
3,749,442	3,942,575	3,965,558	3,976,211
3,790,700	3,944,047	3,965,718	3,976,231
3,800,934	3,944,342	3,965,856	3,976,777
3,806,429	3,945,446	3,966,266	3,977,057
3,825,102	3,945,969	3,966,644	3,977,517
3,832,491	3,946,144	3,967,061	3,977,568
3,838,120	3,947,183	3,968,161	3,977,728
3,840,598	3,947,389	3,968,187	3,978,008
3,843,654	3,947,880	3,968,283	3,978,024
3,843,723	3,948,327	3,969,319	3,978,031
3,847,967	3,949,884	3,970,083	3,978,049
3,853,988	3,950,218	3,970,150	3,978,121
3,858,213	3,951,209	3,970,536	3,978,556
3,861,138	3,952,480	3,970,861	3,978,787
3,861,748	3,952,562	3,970,887	3,978,899
3,879,194	3,952,636	3,971,075	3,978,915
3,881,977	3,953,290	3,971,102	3,978,957
3,883,305	3,953,735	3,971,316	3,978,960
3,889,842	3,954,404	3,971,318	3,979,718
3,897,362	3,955,275	3,971,469	3,979,789
3,906,152	3,955,972	3,971,759	3,979,816
3,907,633	3,956,432	3,971,762	3,979,874
3,907,837	3,956,494	3,971,982	3,979,939
3,910,431	3,958,870	3,972,031	3,980,017
3,913,359	3,958,991	3,972,152	3,980,080
3,916,681	3,959,442	3,972,211	3,980,129
3,917,254	3,960,863	3,972,270	3,980,174
3,917,663	3,961,500	3,972,459	3,980,318
3,918,985	3,962,190	3,972,486	3,980,332
3,924,093	3,962,444	3,972,872	3,980,360
3,924,120	3,962,533	3,972,878	3,980,480
3,929,304	3,962,785	3,973,975	3,981,138
3,930,904	3,962,845	3,974,225	3,981,458
3,930,987	3,962,864	3,974,231	3,981,609
3,931,155	3,962,966	3,974,523	3,981,958
3,935,161	3,963,383	3,974,622	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 30, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-28-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	2-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	7-16-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-6-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-2-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	4-1-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-22-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	4-19-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-5-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	3-8-76

Expiration of patents: The patents within the range of numbers indicated below expire during October 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,907,037 to 2,910,606, inclusive
Plant Patents..... Numbers 1,870 to 1,875, inclusive

REISSUE PATENTS

GRANTED NOVEMBER 16, 1976

ERRATA

For CLASS	See PATENT NO.
269–131	29,037

REISSUES

NOVEMBER 16, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

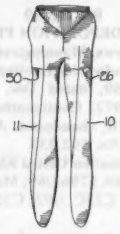
Re. 29,034
SEAMLESS KNIT LOWER BODY GARMENT AND METHOD OF MAKING SAME

Oscar Fregeolle, Hickory, N.C., assignor to Prenihan A.G., Zurich, Switzerland

Original No. 3,748,870, dated July 31, 1973, Ser. No. 186,344, Oct. 4, 1971. Application for reissue July 28, 1975, Ser. No. 599,655

Int. Cl.[2] A41B *9/02*

U.S. Cl. 66—177 **20 Claims**



1. A seamless knit lower body garment including a panty portion and a pair of legs integrally knit with said panty portion, each of said legs comprising successive complete courses, said panty portion comprising fashioned extensions formed of partial courses and extending upwardly from each of said legs, and fashioned front and rear gussets formed of partial courses and being knit integral with and connecting said fashioned extensions, said partial courses of said front and rear gussets extending vertically of said panty portion with their lower ends being joined to the ends of said partial courses of said extensions, and the upper ends of said partial courses of said front and rear gussets including knit selvage edges providing a waist opening in the upper end of said panty portion and between said front and rear gussets.

Re. 29,035
METHODS OF ADDING REACTIVE METALS TO FORM A REMELTING ELECTRODE

Robert B. Herchenroeder, and Howard Joseph Klein, both of Kokomo, Ind., assignors to Cabot Corporation, Kokomo, Ind.

Original No. 3,910,341, dated Oct. 7, 1975, Ser. No. 482,062, June 24, 1974. Application for reissue Nov. 28, 1975, Ser. No. 636,196

Int. Cl.[2] B22D *27/20*

U.S. Cl. 164—59 **18 Claims**

1. The method of forming a remelting electrode containing reactive metals to be subsequently remelted in one of the known remelt techniques comprising the steps of:

a. forming said reactive metal to be added into an elongated member having a length substantially equal to the length of the remelting electrode;

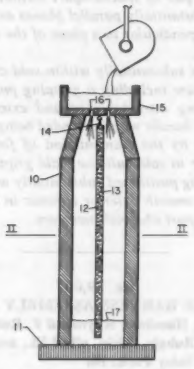
b. suspending said formed reactive metal in a mold having a height equal to the length of the remelting electrode; and

c. pouring the molten metal to be treated around said formed reactive metal in said mold, whereby said reactive metal becomes an integral part of the formed remelting electrode for subsequent remelting.

10. Method of forming a remelting electrode comprising a first metal and reactive metal to be remelted subsequently, said method comprising:

a. forming said reactive metal into an elongated member having a length substantially equal to the length of the remelting electrode;

b. postioning said formed reactive metal in a mold having a height at least equal to the height of the remelting electrode;



c. pouring molten first metal into said mold around said formed reactive metal;

d. solidifying said molten first metal in said mold around said formed reactive metal thereby to form said remelting electrode.

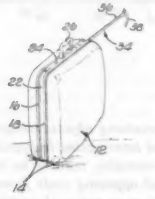
Re. 29,036
LUGGAGE TRANSPORT STRUCTURE

Robert G. Hager, 219 Aderno Way, Pacific Palisades, Calif. 90272

Original No. 3,799,568, dated Mar. 26, 1974, Ser. No. 271,966, July 14, 1972. Application for reissue Aug. 20, 1975, Ser. No. 606,371

Int. Cl.[2] B62B *1/12*

U.S. Cl. 280—37 **8 Claims**



7. In combination with a container, such as a suitcase, having wheels mounted thereon for supporting said suitcase and being rotatable with respect to said suitcase:

a U-shaped channel secured to at least a portion of the periphery of said suitcase, said U-shaped channel comprising a pair of spaced-apart members extending outwardly in parallel planes and in a plane substantially perpendicular to a plane of the outer periphery of said suitcase;

a housing member connected to said channel; and,

a handle structure including a gripping portion, said handle structure being retractable to said housing member to temporarily secure said handle to said housing member and extendable from said housing member to transport said

suitcase, said gripping portion when retracted being positioned substantially within said U-shaped channel to present a smooth exterior contour in combination with said spaced-apart channel members.

8. In combination with a suitcase having a rigid center frame and having wheels mounted thereon for supporting said suitcase and being rotatable with respect to said suitcase:

an elongated, U-shaped rigid channel secured to at least a portion of the periphery of said suitcase substantially along a medial plane of said suitcase, said U-shaped channel comprising a pair of spaced-apart members extending outwardly in substantially parallel planes and in a plane substantially perpendicular to a plane of the outer periphery of said suitcase;

retaining means substantially within said channel; and,

a handle structure including a gripping portion, said handle structure being retractable to and extendable from said channel, said handle when extended being used to transport said suitcase by the transmission of forces through said rigid member to said suitcase, said gripping portion when retracted being positioned substantially within said channel to present a smooth exterior contour in combination with said spaced-apart channel members.

Re. 29,037

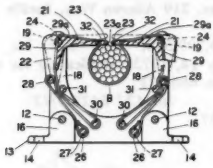
WIRE CABLE HARNESS ASSEMBLY APPARATUS

Jack E. Caveney, Hinsdale; Raymond F. Roberson, Plainfield, and Joseph S. Rohaly, Alsip, all of Ill., assignors to Panduit Corporation, Tinley Park, Ill.

Original No. 3,627,300, dated Dec. 14, 1971, Ser. No. 20,926, Mar. 19, 1970. Continuation of Ser. No. 423,603, Dec. 10, 1973, abandoned. Application for reissue Sept. 2, 1975, Ser. No. 609,469

Int. Cl.[2] B65B *27/10, 67/00;* **F16L** *3/22*

U.S. Cl. 269—131 **16 Claims**



21. A holder for retaining objects comprising a frame, a pair of arms on said frame terminating in opposing ends, at least one of said arms being movable relative to the other to vary the spacing between said opposing ends from a normal retaining position to an insertion or removal position wherein said ends are spaced to define an opening therebetween, biasing means for biasing said one of said arms into said retaining position and a longitudinally extensible elastic band disposed across and adjacent to said opening, said band having a first position wherein a portion of said band is disposed adjacent said ends and a second position wherein said portion is spaced from said ends and disposed between said frame and said arms, said objects being disposed between said ends and said portion when said band is in said second position and said objects are retained in said holder, said band comprising means for resiliently urging said objects toward said ends and being adapted to move from said first position to said second position in response to insertion of an object between said ends whereby an object inserted between said ends is releasably retained by the coaction of said elastic band and said arms.

Re. 29,038

HIGH STRENGTH ZINC ALLOYS

Robert Wayne Balliett, Beaver Falls, Pa., assignor to St. Joe Minerals Corporation, New York, N.Y.

Original No. 3,850,622, dated Nov. 26, 1974, Ser. No. 358,275, May 8, 1973. Application for reissue Jan. 8, 1976, Ser. No. 647,583

Int. Cl.[2] C22C *17/00*

U.S. Cl. 75—178 AM **1 Claim**

2. Zinc base alloys [as defined in claim 1] *having improved mechanical properties* consisting essentially of 20 to 24 percent by weight of aluminum, 0.75 to 1.1 percent *by weight* of copper, 0.04 to 0.05 percent by weight of magnesium, 0.01 to 0.03 percent by weight of calcium and balance zinc.

Re. 29,039

METAL DEPOSITION PROCESS

Timothy Douglas Andrews, Manningtree, England, assignor to Imperial Chemical Industries Limited, London, England

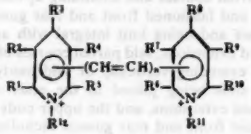
Original No. 3,853,589, dated Dec. 10, 1974, Ser. No. 222,991, Feb. 2, 1972. Continuation-in-part of Ser. No. 88,173, Nov. 9, 1970, abandoned. Application for reissue June 30, 1975, Ser. No. 592,033

Claims priority, application United Kingdom, May 20, 1971, 16006/71; Nov. 26, 1969, 57862/69; May 26, 1970, 25203/70

Int. Cl.[2] C23C *3/02;* **C25D** *5/00*

U.S. Cl. 204—30 **21 Claims**

1. A process for the deposition of metal in or on substrate characterized in that the substrate contains or consists of, as active component, an organic compound derived from a cation of the general formula



where R^{1-12} are hydrogen, halogen or organic substituents and n = 0 or an integer, comprising contacting the substrate with an electroless plating solution.

Re. 29,040

BUBBLE-FREE, HIGH BARRIER VINYLIDENE CHLORIDE POLYMER FILMS AND PROCESS OF PREPARATION

Richard T. Marzolf, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Original No. 3,891,598, dated June 24, 1975, Ser. No. 441,541, Feb. 11, 1974. Continuation of Ser. No. 323,315, Jan. 12, 1973, abandoned. Application for reissue Sept. 19, 1975, Ser. No. 615,007

Int. Cl.[2] C08F *37/02, 45/04, 45/56*

U.S. Cl. 260—42.56 **3 Claims**

1. An improved process for preparing extruded vinylidene chloride polymer film containing modifying amounts of an ethylene-vinyl acetate copolymer, said film being substantially free from bubbles, holes and white specks which process comprises

a. preparing a blend of (a) a dry, powdered, nonplasticized normally crystalline vinylidene chloride polymer containing from about 70 to about 95 percent by weight of vinylidene chloride interpolymerized with from about 30 to

about 5 percent by weight of at least one monoethylenically unsaturated monomer copolymerizable with vinylidene chloride, with (b) from about 0.05 to about 1 percent based on polymer weight of magnesium oxide having an average particle size of less than about 0.5 micron and wherein said blend is prepared by introducing said magnesium oxide beneath the surface of the mass of dry vinylidene chloride polymer particles [while said particles are maintained in motion] and where said magnesium oxide coats said particles prior to contact of said magnesium oxide with a metal surface.

2. removing from said blend any agglomerate having a diameter in excess of about 500 microns, then
3. admixing said blend with said ethylene-vinyl acetate copolymer in an extruder which is used to thermally fabricate the admixture into film form.

PLANT PATENTS

GRANTED NOVEMBER 16, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,973
PEACH TREE
Claron O. Hesse, Kingsburg, Calif., assignor to The Regents of the University of California, Berkeley, Calif.
Filed Sept. 10, 1975, Ser. No. 612,163
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—43 1 Claim

1. The new and distinct variety of peach tree herein described and illustrated, and identified by the characteristics enumerated above.

3,974
DWARF SPUR TYPE RED DELICIOUS APPLE TREE
Jack D. Slusarenko, Rte. 2, Box 355, Milton-Freewater, Oreg. 97862
Filed Sept. 29, 1975, Ser. No. 617,450
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—35 1 Claim

1. A new and distinct variety of apple tree, substantially as herein shown and described, characterized particularly as to novelty by the dwarf nature of its growth and characteristics, its compact growth structure, and its stiff and rigid branches.

3,975
ROSE PLANT
Robert G. Jelly, Richmond, Ind., assignor to E. G. Hill Co., Inc., Richmond, Ind.
Filed Oct. 20, 1975, Ser. No. 623,061
Int. Cl.[2] A01H 5/00
U.S. Cl. Plt.—24 1 Claim

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by its superior bud form, flower color, and its harder and more lustrous foliage compared to its seed parent, and by its free and continuous production of large flowers on moderately strong stems of medium length.

3,976
PEACH TREE
Claron O. Hesse, Kingsburg, Calif., assignor to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 20, 1975, Ser. No. 624,149
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—43 1 Claim

1. The new and distinct variety of peach tree herein described and illustrated, and identified by the characteristics enumerated above.

3,977
PEACH TREE
Claron O. Hesse, Kingsburg, Calif., assignor to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 20, 1975, Ser. No. 624,150
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—43 1 Claim

1. The new and distinct variety of peach tree herein described and illustrated, and identified by the characteristics enumerated above.

3,978
PEACH TREE
Claron O. Hesse, Kingsburg, Calif., assignor to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 20, 1975, Ser. No. 624,151
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—43 1 Claim

1. The new and distinct variety of peach tree herein described and illustrated, and identified by the characteristics enumerated above.

3,979
STRAWBERRY PLANT
Royce S. Bringhurst, Davis, and Victor Voth, Santa Ana, Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 23, 1975, Ser. No. 625,282
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—49 1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

3,980
STRAWBERRY PLANT
Royce S. Bringhurst, Davis, and Victor Voth, Santa Ana, Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 23, 1975, Ser. No. 625,283
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—49 1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

3,981
STRAWBERRY PLANT
Royce S. Bringhurst, Davis, and Victor Voth, Santa Ana, Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Filed Oct. 23, 1975, Ser. No. 625,333
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—48 1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

3,982
STRAWBERRY PLANT
Harold A. Johnson, Jr., Watsonville, Calif., assignor to Driscoll Strawberry Associates, Inc., Watsonville, Calif.
Filed Dec. 4, 1975, Ser. No. 637,802
Int. Cl.[2] A01H 5/03
U.S. Cl. Plt.—49 1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

PATENTS

GRANTED NOVEMBER 16, 1976

ERRATA

For CLASS	See PATENT NO.
241–005	3,991,423
092–131	3,991,661
100–257	3,991,681
242–055.53	3,991,878
296–065 A	3,992,046
356–032	3,992,095
356–036	3,992,096
404–118	3,992,124
062–055	3,992,169
062–535	3,992,170
062–419	3,992,171
055–427	3,992,172
055–501	3,992,173
055–067	3,992,174
055–067	3,992,175
055–071	3,992,176
055–288	3,992,177
051–295	3,992,178
429–221	3,992,222
429–014	3,992,223
029–623.5	3,992,224
429–001	3,992,225
429–089	3,992,226
429–121	3,992,227
429–090	3,992,226
204–158 R	3,992,289
352–014	3,992,305
526–292	3,992,363

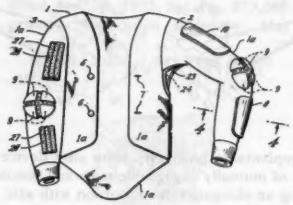
PATENTS

GRANTED NOVEMBER 16, 1976

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

3,991,420
PROTECTIVE BASEBALL BATTING GARMENT
Julius P. Savarino, 2805 Pearl St., Groves, Tex. 77619
Filed Aug. 11, 1975, Ser. No. 603,765
Int. Cl.² A41D *13/08, 27/26;* **A43B** *19/00*
U.S. Cl. 2—2 **5 Claims**

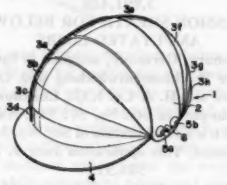


1. A protective baseball batting garment having padded flexibly divided sections, said padded divided sections covering the outer elbow portions of said garment to protect the elbows of the batter wearing said garment when hit on the padded elbows divided sections of said garment, small flexible areas between said padded elbow divided sections of said garment to allow the arms of the batter wearing said garment freedom of movement of flexing the elbows in swinging the bat to hit a thrown baseball by the opposing baseball pitcher.

3,991,421
PERSONAL BLAST PROTECTION ARMOR
Charles L. Stratten, Stanhope, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Sept. 9, 1975, Ser. No. 611,777
Int. Cl.² A41D *13/00*
U.S. Cl. 2—2 **6 Claims**

1. Blast protection armor for bomb disposal personnel, which comprises:
means for shielding the waist area of said personnel from the blast and shock waves of an uncontrolled explosion;
means for shielding the chest area of said person from said blast and shock waves, said chest shielding means interlocking with said waist shielding means;
means for shielding the head and neck areas of said personnel from said blast and shock waves, said head and neck shielding means interlocking with said chest shielding means;
harness means for supporting said waist, chest, head and neck shielding means from the shoulders and waist of said personnel; and
ventilation means for allowing said personnel to comfortably breath and see while said personnel is enclosed within said waist, chest, head and neck shielding means.

3,991,422
DEFENSIVE COVERING FOR THE HEAD
Hikogi Saotome, 7-13, 2-chome, Higashi-kokubun, Ichikawa, Chiba, Japan
Filed Sept. 3, 1975, Ser. No. 610,005
Claims priority, application Japan, Apr. 21, 1975, 50-54420[U]; May 22, 1975, 50-69160[U]; July 24, 1975, 50-102682[U]
Int. Cl.² A42B *1/08*
U.S. Cl. 2—410 **5 Claims**

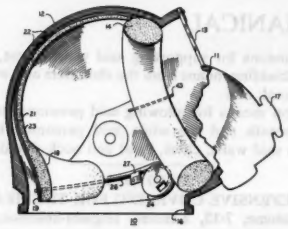


1. A defensive covering for the head comprising:
arc-shaped straps divided into two groups, said straps in one group having different radii of curvatures which become smaller in turn from the outer strap to the inner strap, and each of said straps having a width which becomes narrower toward the ends thereof;
two pivot means each provided at both ends of said straps in one group for pivotably connecting said straps in said group;
engaging means provided at the sides of each of said straps for engaging between the adjacent straps when said straps are expanded; and
locking means provided at end portions of said two groups of said straps, said locking means being operable when said straps of said two groups are fully expanded.

3,991,423
HELMET WITH ACTUATED NECK PAD
Richard F. Jones, Santa Barbara, Calif., assignor to General Aquadyne, Inc., Santa Barbara, Calif.
Filed Sept. 8, 1975, Ser. No. 610,915
Int. Cl.² A63B *33/00*
U.S. Cl. 2—415 **1 Claim**

1. Diving gear for the head of a diver comprising:
a. a face mask;
b. a rigid helmet secured to the face mask to enclose the head of a diver and having a neck opening;
c. a neck pad on the interior of the helmet adjacent to the neck opening opposite the face mask;
d. a leaf spring having one end connected to the neck pad and extending vertically therefrom and having the other end secured to the interior of the helmet and normally biasing the neck pad against the interior of the helmet and away from the face mask characterized by having a shape that normally fits snugly against the interior of the helmet;
e. and manually operable means of moving the neck pad toward the face plate to thereby engage the neck of the

diver to hold the helmet and face mask in place on the diver's head,



whereby the pad has a maximum amount of retraction when said manually operable means is released, so that the neck opening is of maximum size for easy placement on or removal from the diver's head.

3,991,424

COMPRESSION SHEATH FOR BELOW KNEE AMPUTATED LIMBS

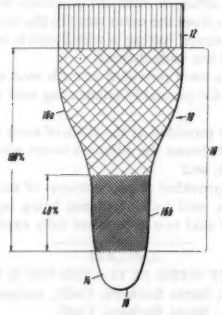
Jan Prahl, Luneburg, Germany, assignor to Ipos Gesellschaft fur Integrierte Prothesenentwicklung und Orthopadietechnischen Service m.b.H. & Co. K.G., Luneburg, Germany

Continuation-in-part of Ser. No. 501,816, Aug. 29, 1974, abandoned, which is a continuation of Ser. No. 342,934, March 2, 1973, abandoned. This application June 9, 1975, Ser. No. 584,915

Claims priority, application Germany, Mar. 20, 1972, 2213336

Int. Cl.[2] A61F *1/00, 13/06*

U.S. Cl. 3—1 **7 Claims**



1. A compression sheath for an amputee limb stump consisting essentially of fabric of highly resilient yarn having characteristics enabling said sheath to slide smoothly upon an amputee limb stump upon which said sheath is applied, said sheath comprising a first open end formed by a band defining an opening for insertion therethrough of a limb stump, a second closed end defined by an enclosed section of said sheath, and an intermediate section extending continuously between said band and said enclosed end, said intermediate section being comprised of a lower intermediate portion extending contiguously from said enclosed section and an upper intermediate portion extending between said band and said lower intermediate portion, said lower intermediate portion being formed with a knitted pattern having a higher yarn density than said upper intermediate portion, said sheath having a diameter that progressively decreases from said open end towards said closed end, whereby said sheath when worn on a limb stump will produce an increasing radial compression force in a direction toward the end of the stump and said closed end without undesired axial frictional forces thereon.

3,991,425

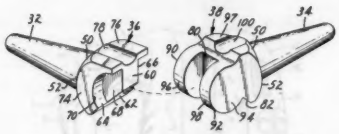
PROSTHETIC BONE JOINT DEVICES

Lawrence L. Martin, Hugo, and Robert C. Westerberg, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 20, 1975, Ser. No. 633,942

Int. Cl.[2] A61F *1/24*

U.S. Cl. 3—1.91 **5 Claims**



1. An implantable prosthetic bone joint device consisting essentially of mutually engageable male and female members each having an elongated shank portion with axis, said shank portion being for engagement in the medullary canal of a bone, and each further having a head portion with a grooved dorsal surface and comprising lands intersecting at about 135°, a first land being at right angles to the axis of the shank portion and the said dorsal surface and the second being directed backwards toward the shank portion, the female head further having two condyles with convex condylar surface of greater than 180° of arc one on either side of said lands and extending beyond said first land forming an intercondylar space therebetween and with center of curvature of said surfaces at the line of intersection of said lands and the male head having two concave condylar surfaces one on either side of said lands and with center of curvature at the line of intersection of said lands, said lands thereby extending beyond said condylar surfaces and forming a projection engaging with the intercondylar space of said female head.

3,991,426

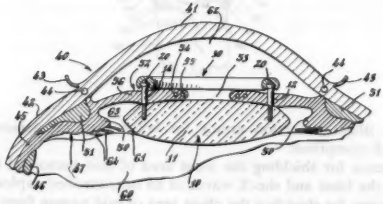
POSTERIOR CHAMBER ARTIFICIAL INTRAOCULAR LENS WITH RETAINING MEANS AND INSTRUMENTS FOR USE THEREWITH

Leonard Flom, Arlen Road, Westport, Conn. 06880, and Kenneth J. Rodgerson, 83 Melville Ave., Fairfield, Conn. 06430

Continuation-in-part of Ser. No. 549,853, Feb. 14, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 648,936

Int. Cl.[2] A61F *1/16, 1/24, 9/00*

U.S. Cl. 3—13 **61 Claims**



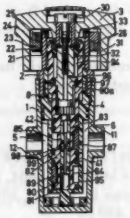
1. An artificial intraocular lens for implantation in the posterior chamber of an eye, the artificial intraocular lens comprising an optical zone portion fabricated of transparent material and shaped similar to a natural lens, a plurality of posts attached to the optical zone portion near the periphery thereof and extending forwardly therefrom, and retaining

means adapted to be secured to the ends of said posts, wherein said artificial intraocular lens may be implanted in the posterior chamber of an eye with the posts protruding forwardly from the optical zone portion through the iris and into the anterior chamber of the eye, and wherein said retaining means may be secured to the ends of the posts in the anterior chamber of the eye, wherein said posts and retaining means together hold and position the lens within the eye and prevent the posts from pulling through the iris thereof.

3,991,427
MIXING FAUCET

Karl Kemker, Seilerblick 31, 5860 Iserlohn, Germany

Filed Apr. 30, 1975, Ser. No. 573,061
Claims priority, application Germany, May 2, 1974, 2421197
Int. Cl.² E03C *1/04*; F16K *11/00*
U.S. Cl. 4—192 **12 Claims**



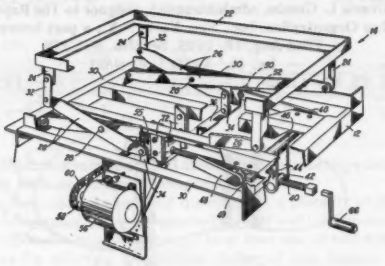
1. Mixing faucet for sanitary installations comprising:
a sealed housing defining a mixing chamber and a water outlet;
a mixing bushing having hot and cold outlet openings disposed radially in axial direction adjacent said mixing chamber and being mounted in said sealed housing;
a multistage pressure balanced control piston means being displaceable within said mixing bushing for opening and closing said water outlet, said control piston including three tandem interconnected pistons; and
two segment slide means each positioned between different adjacent two of said three pistons, respectively, said segment slide means for alternately opening and closing said hot and cold outlet openings for hot and cold water in said mixing bushing, said hot and cold outlet openings discharging into said mixing chamber.

3,991,428
ARTICULATED BED

Paul B. Hanson, 2761 Eastwood Drive, Decatur, Ga. 31907

Continuation of Ser. No. 406,567, Oct. 15, 1973, abandoned. This application Dec. 18, 1974, Ser. No. 533,980
Int. Cl.² A47C *3/32*; A61G *7/02*
U.S. Cl. 5—63 **4 Claims**

1. An articulated bed comprising:
a. a rectangular horizontally disposed main frame provided at one end with a recess;
b. means for supporting said main frame in a stationary horizontal position;
c. a U shaped main mattress carries on said main frame, said main mattress having a rectangular recess in one end thereof over the recess of said main frame, said main mattress being supported with its upper surface in a prescribed horizontal plane by said main frame;
d. an auxiliary frame for the recess of said main frame, said auxiliary frame having a vertically movable horizontally disposed rigid support member;
e. a rectangular auxiliary mattress supported by said support member, the shape of said auxiliary mattress conforming to the shape of the recess of said main mattress, one end of said auxiliary mattress being generally aligned with said one end of said main mattress and the upper surface of said auxiliary mattress being coplanar with the upper surface of said main mattress when said auxiliary mattress is disposed in its uppermost position by said support member;
f. said auxiliary frame also including incremental adjustment means supporting said support member for incrementally adjusting, substantially in a vertical path, the

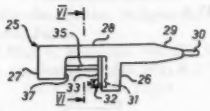


height of said support member relative to the height of said main frame for positioning said auxiliary mattress in horizontal planes at a plurality of levels relative to said main mattress and for supporting and maintaining said auxiliary mattress stationary at each such level, said means being sufficiently rigid at each such level that said auxiliary mattress will support the weight of a person thereon, while preventing tilting and appreciable lateral movement of said auxiliary mattress.

3,991,429
APPARATUS FOR SHARPENING EDGES OF SKIS

Emil Honauer, Reussfeld, 6037 Root, Lucerne, Switzerland

Continuation-in-part of Ser. No. 532,694, Dec. 13, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,610
Claims priority, application Switzerland, Dec. 13, 1973, 17485/73
Int. Cl.² B25F *1/00*; B21K *17/00*
U.S. Cl. 7—14.1 R **4 Claims**



1. An apparatus for sharpening edges, particularly the edges of skis, comprising
a file; and
a holder for said file comprising
an elongated body having a cross-section in substantially the shape of a U with one leg of the U being longer than the other, said longer leg including
means defining an elongated recess extending inwardly in the inner surface of the longer leg of said body to receive said file, the depth of said recess being less than the thickness of said file,
the distal end surface of the other, shorter leg of the U constituting a guide surface for the file;
means for removably attaching said file to the inwardly facing surface of the longer leg of the U of said body with

the long dimension of said file extending parallel to the long dimension of said body, said means including

spring means extending between the inwardly facing surface of said shorter leg and said file; and

handle means attached to an outwardly facing surface of said body for manually manipulating said body.

3,991,430

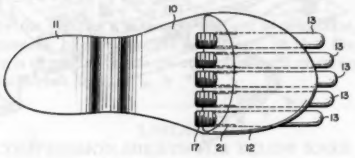
SHOE LAST

Alexis A. Gumbs, deceased, late of Staten Island, N.Y. (by Uranie L. Gumbs, administratrix), assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1975, Ser. No. 605,379

Int. Cl.² A43D *5/00, 9/00*

U.S. Cl. 12—115.2 **3 Claims**



1. A shoe last for selectively deforming the interior of a shoe to fit comfortably about the toes of a wearer of the shoe, comprising

a shoe last formed of a heel section and a toe section,

said toe section fitted with a plurality of individual projecting members that extend beyond the forward portion of the toe section in the axial direction of the shoe last, with the length that each projecting member extends beyond the toe section being individually adjustable, in which

each projecting member is formed with a male thread that engages an individual female thread formed in the toe section so that rotation of the projecting member varies the extent of projection beyond the toe section.

3,991,431

MOP FRAME ASSEMBLY

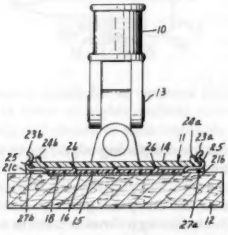
James E. Thielen, New Brighton, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 3, 1974, Ser. No. 502,667

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² A47L *13/254*

U.S. Cl. 15—147 A **5 Claims**



1. A mop frame assembly comprising:

a mop frame, a handle holder attached to said mop frame, said handle holder and mop frame being formed of materials that are resistant to normal cleaning solutions, and said mop frame comprising:

a rigid body member and a rigid base member removably engageable with said body member wherein said body member is formed with opposed parallel edge portions and having parallel depending flange portions along said edge portions, said flange portions being directed in the same direction and commencing on either side of an intermediate portion of each of said edge portions, the edge portions of said intermediate portions being slightly inset from and parallel to said parallel edge portions of said body member, said base member having (1) a pair of parallel upstanding opposed elongate S-shaped stiff but flexible engaging members positioned to engage said intermediate edge portions between the intermediate ends of said flange portions, the curved portion of said engaging members adjacent said base member being spaced apart a distance corresponding to the spacing between edge portions of said body member (2) and substantially parallel opposed edge portions on said base member which are spaced apart so that said base member fits loosely within the area defined by said flange portions but close enough to permit one of said base member edge portions to come into contact with an adjacent body member flange portion when the opposite S-shaped engaging member is disengaged from said body member to prevent the base member from being completely disengaged,

one of said body member or said base member being attached to said handle holder.

3,991,432

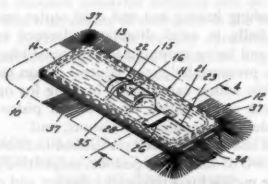
DUST MOP WITH PEEL-OFF MOP HEAD

Dana K. Griffin, 24714 Madison Court, Apt. 296, Farmington, Mich. 48024, and John R. Wilson, 3203 E. Bradford Drive, Birmingham, Mich. 48010

Filed Feb. 26, 1975, Ser. No. 553,239

Int. Cl.² A47L *13/252*

U.S. Cl. 15—229 BP **1 Claim**



1. In a dust mop having a mop handle, the combination comprising:

a. a rectangular mop head frame, including a pair of elongated, spaced apart parallel end rods which are joined at the side ends thereof by a pair of integral parallel side rods, including means for attachment of the frame to a mop handle;

b. a frame cover encasing said mop head frame;

c. a mop head, including strands of yarn on the lower side thereof, and a backing material on the upper side thereof;

d. releasable fastening means for releasably attaching said frame cover to said mop head;

e. said frame cover is made from a nonstretching, flexible plastic material;

f. said backing material on the upper side of said mop head comprises a woven cloth backing material substantially the same size as the cover;

g. said releasable fastening means includes a releasable hook means carried on said frame cover for releasably attaching said frame cover to said woven cloth backing material on said mop head; and,

h. said releasable fastening means includes a plurality of strip members secured to the lower side of said frame cover, and wherein said strip members have operatively mounted on the lower side thereof. a multiplicity of hooks in hooking engagement with the woven cloth.

3,991,433

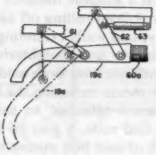
BLOWER EQUIPMENT FOR ROLL-OVER CAR WASH

John F. Cirino, Box 191, Southampton, Pa. 18966

Division of Ser. No. 343,869, March 22, 1973, Pat. No. 3,877,107. This application May 16, 1974, Ser. No. 470,599

Int. Cl.² A47L 5/38; B60S 3/06

U.S. Cl. 15—312 R 2 Claims



1. Roll-over type car drying equipment comprising a generally horizontally extended frame structure mounted to travel over a car washing station, an air discharge nozzle for directing air downwardly against upwardly presented surfaces of a car in said station, the nozzle having hollow hub parts at least in part of generally cylindrical form extended therefrom in opposite directions and both mounted on the frame structure with their axes generally horizontal and extended transversely of the direction of travel and providing for upward and downward pivotal movement of the nozzle, the equipment also including air supply ducts extended to the nozzle through both of the hub parts of cylindrical form.

3,991,434

BALL CASTOR

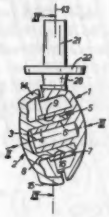
Michael Joseph James, Cheltenham, England, assignor to Global Castors and Hardware Limited, England

Filed July 22, 1975, Ser. No. 598,160

Claims priority, application United Kingdom, Aug. 8, 1974, 34907/74

Int. Cl.² B60B 33/08

U.S. Cl. 16—18 A 11 Claims



1. A castor comprising a body adapted to be mounted about a vertical mounting axis and moulded with a first integral bearing boss, a wheel moulded with a second integral bearing boss and having an external peripheral groove on said boss, said wheel being rotatably mounted on said body with said first and second integral bearing bosses engaging one within the other in a manner to provide a bearing for the wheel about a rotation axis offset laterally of and inclined to said vertical mounting axis of the body which is further moulded with a spindle bore aligned with said vertical axis, and a mounting spindle located in said spindle bore and engaging in said peripheral groove to locate the wheel axially with respect to the body, said body and said spindle having interengaging formations which locate the spindle axially in the body and provide a snap-in fixing of the spindle in the body moulding.

3,991,435

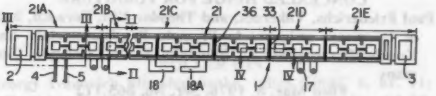
DECORATIVE TRAVERSE ROD

James A. Ford, Sherman Township, St. Joseph County, Mich., assignor to Kirsch Company, Sturgis, Mich.

Filed Apr. 18, 1975, Ser. No. 569,214

Int. Cl.² A47H 1/04, 5/00

U.S. Cl. 16—94 D 15 Claims



1. A decorative traverse rod assembly for supporting curtain means, such as draperies, comprising:

a hollow, slotted elongated traverse rod, a plurality of draper hangers slidably supported on said rod, and operator responsive means connected to at least one of said hangers for effecting longitudinal sliding of said hangers as required to effect normal opening and closing movement of such draperies;

a plurality of modular facing means, each thereof being of selected modular length and each being fixedly supported on said traverse rod and positioned in serially arranged relationship thereon for providing a decorative covering for said traverse rod and thereby providing an operable and decorative composite traverse rod unit;

each of said facing means being generally C-shaped in cross-section and positioned on said traverse rod to partially embrace same, said C-shaped section having an upper flange extending at least partially over an upper side of said traverse rod and a lower flange extending at least partially under a lower side of said traverse rod;

one of a pair of end-to-end abutted facing means including a lip projecting between and fitting snugly against said flanges of the other of said pair, and fastening means fixing said pair rigidly together; and

mounting means for mounting said composite rod unit to a supporting surface.

3,991,436

BUTT HINGE WITH MEANS TO PREVENT THE WEAR OF KNUCKLES

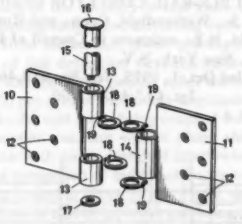
Mitsuo Nagase, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed May 6, 1975, Ser. No. 574,924

Claims priority, application Japan, May 8, 1974, 49-51997

Int. Cl.² E05D 11/04

U.S. Cl. 16—136 1 Claim



1. A hinge comprising in combination:

a. a pair of leaves, one of which has at least one knuckle along a marginal edge thereof, and the other of which has at least two spaced knuckles along an adjacent marginal

edge, said knuckles being apertured and axially aligned, the space between said two knuckles being substantially greater than the length of said one knuckle;

b. a pintle extending through said knuckles; and

c. a pair of wear rings surrounding said pintle at each end of said one knuckle, and such four wear rings, with said one knuckle, substantially filling said space, each of said wear rings having a pair of fingers straddling that one of said leaves whose knuckle it engages.

3,991,437

CONCEALED HINGE FOR FURNITURE

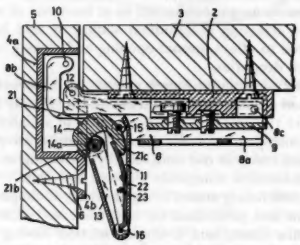
Paul Friederichs, Vilkerath, and Theodor Vitt, Porz-Eil, both of Germany, assignors to Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co., Cologne, Germany

Filed Mar. 8, 1976, Ser. No. 665,112

Claims priority, application Germany, Mar. 14, 1975, 2511201

Int. Cl.² E05D *11/10*

U.S. Cl. 16—139 **19 Claims**



1. A hinge comprising a first element adapted to be secured to one of a pair of relatively movable bodies, a second element having opposite end portions, first pivot means pivotally mounting a first of said second element end portions to the other of said pair of relatively movable bodies, means slidably coupling a second end portion of said second element relative to said first element, a third element, said third element having opposite end portions and a medial portion therebetween, second pivot means pivotally mounting a first of said third element end portions to said first element, third pivot means pivotally mounting said third element medial portion to said second element between the first and second end portions of the latter, latch means pivotally connected to said third element by said third pivot means, and said latch means including a free terminal end portion for snap engagement with a portion of said other body in a closed position of said bodies.

3,991,438

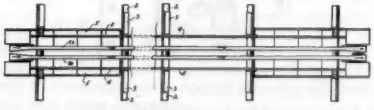
DOUBLE-RAIL CONVEYOR DESIGN

Walter Giger, Jr., Wethersfield, Conn., and Rudy G. Westervelt, Newfield, N.Y., assignors to Council of Livestock Protection, Inc., New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,464

Int. Cl.² A22B *5/00*

U.S. Cl. 17—1 A **1 Claim**



1. A conveyor system for slaughtering animals in an upright position, comprising

support means anchored on a horizontal platform floor;

a pair of parallel rails supported by said support means above said floor at a distance therefrom greater than the length of the legs of said animal so that said animal rests on and in contact with both said rails and supported thereby in an upright position with its legs straddling both said rails and above and at a distance from said floor, said rails being shaped to be round at the top surfaces thereof and extending from a starting station to a slaughtering station;

a pair of stationary vertical side walls located on either side of said rails and at a suitable distance therefrom for preventing said animal from rolling off said rails while being conveyed thereby, said walls extending substantially from said starting station to said slaughtering station;

conveyor means positioned on both said rails and comprising a flexible belt means covering the top surfaces of said rails, a chain means attached to said belt means and disposed within said rails, a pair of lip means attached toward the edges of said belt means to cover said edges, and means attached to the edges of said belt means for aligning said belt means on said rails; and

motor means for continuously moving said conveyor means, and comprising gear means located at one end of said conveyor means and motor for driving said gear means, said gear means driving said chain means to drive said belt means, whereby said animal to be slaughtered is moved solely by said belt means in an upright position to said slaughtering station to be slaughtered in said upright position.

3,991,439

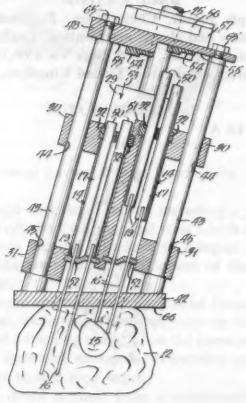
MEAT TENDERIZER APPARATUS

Richard C. Wagner, Frankfort, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.

Filed Feb. 7, 1975, Ser. No. 547,983

Int. Cl.² A22C *9/00*

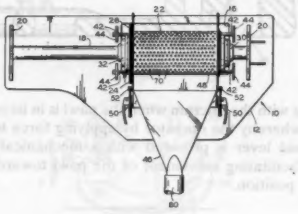
U.S. Cl. 17—25 **4 Claims**



1. Apparatus for tenderizing meat, comprising: a plurality of knives each with a cutting edge end; a support for the knives on which said knives are mounted for reciprocation between meat penetrating position and retracted position; conveyor means for conveying meat to be tenderized beneath said knives through a meat tenderizing zone; meat retaining means at said zone comprising a plurality of meat retainers; means for positioning said retainers in transverse alignment across the width of said conveyor at said zone; means for reciprocating said retainers to and from meat engaging position; means for independently locking each said retainer in its meat engaging position during withdrawal of corresponding said knives

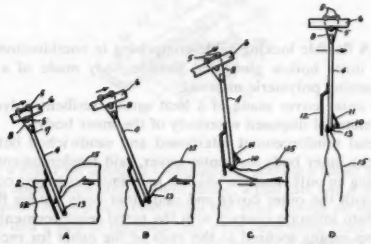
from the meat; and means for independently releasing each said retainer when said knives are substantially completely withdrawn from the meat.

3,991,440
FOOD PELLET FORMER
Jay D. Hendrickson, Jr., Astoria, Oreg., assignor to Castle & Cooke, Inc., Honolulu, Hawaii
Filed Oct. 25, 1974, Ser. No. 517,855
Int. Cl.² A22C *7/00*
U.S. Cl. 17—32 **11 Claims**



1. In a food pellet former,
filling spout means supplied with a pressurized plastic mass of food to be molded,
a drum having molding cavities extending generally radially therethrough,
mounting means mounting the drum rotatably and with an exterior portion of the drum in engagement with the filling spout means,
means for rotating the drum past the filling spout means, whereby the cavities are filled with the food to form pellets,
core means engaging the portion of the inner periphery of the drum at the filling spout means for closing the cavities being filled by the filling spout means,
and ejecting means for pushing the pellets out of the cavities after the cavities have been revolved past the filling spout means,
the mounting means including an arbor member and bearing means slidable along the arbor member and rotatably mounting the drum thereon.

3,991,441
MECHANIZED SHACKLING/HOISTING
Walter Giger, Jr., Wethersfield, Conn., assignor to Council of Livestock Protection, Inc., New York, N.Y.
Filed Oct. 1, 1975, Ser. No. 618,467
Int. Cl.² A22C *15/00*
U.S. Cl. 17—24 **2 Claims**



1. A shackling and hoisting arrangement, comprising
an elongated arm having a top portion and a bottom portion; said bottom portion ending with two parallel bars and an opening therebetween;
overhead rail means;
means for movably attaching said top portion of said arm to said overhead rail means;
a snare having a circularly shaped end pivotally connected to said end bars of said arm;
resilient means for holding said snare parallel with and within said end bars; and
locating plate attached to said bottom portion of said arm and extending in back of said snare at a sufficient distance to cause the hock of said animal's hind leg to be caught by said snare when the animal's hind leg hoof hits the locating plate.

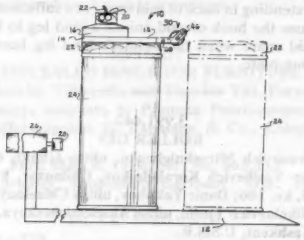
3,991,442
ROLLER GIN
Georgy Ivanovich Miroshnichenko, ulitsa Glinki, 6, kv. 11; Rostislav Vasilievich Korabelnikov, Chilanzar, kvartal 20, dom 18, kv. 106; Danir Yakubov, ulitsa Chizelnaya, 72, and Pavel Nikolaevich Tjutin, ulitsa Akademicheskaya, 9, kv. 25, all of Tashkent, U.S.S.R.
Filed Mar. 3, 1975, Ser. No. 554,545
Int. Cl.² D01B *1/06*
U.S. Cl. 19—53 **7 Claims**

1. A roller gin comprising: a rotatable ginning roller extending horizontally; a knife urged against the surface of said ginning roller and comprised of individual sections; a vibrator imparting to said knife an oscillatory motion in a radial path with respect to the direction of said ginning roller, whereby fibers are dragged in between the knife and the ginning roller when said ginning roller rotates, said vibrator at regular intervals urging each of the sections of said knife against the surface of said ginning rollers and deflecting each of the sections of said knife from the surface of the ginning roller so that at the moment of full deflection between each section of the knife and the surface of the ginning roller there is an exposure gap equal to 30 per cent of the double amplitude of the oscillations of said knife, said knife being coupled with said vibrator so that the section oscillate with a phase shift; a rotatable stripping organ with vanes installed lengthwise the blade of said knife and comprised of individual sections for detaching seeds from the drawn-in fibres by said vanes, said vanes of the adjacent sections of said stripping organ being turned through an angle sufficient for ensuring cooperation of each of said vanes with the respective section of said knife, a rigid drive coupling said stripping organ with said vibrator, said rigid drive having a gearing ratio multiple of the number of said vanes in each section of said stripping organ for coordinating the motions of the stripping organ and the knife.

3,991,443
SLIVER SEPARATING MEANS

Richard J. Savageau, Seneca, S.C., assignor to Platt Saco Lowell Corporation, Easley, S.C.

Filed June 23, 1975, Ser. No. 589,015
Int. Cl.² B65H *54/76*
U.S. Cl. 19—159 A **13 Claims**



1. In a textile sliver coiler apparatus having a frame; a coiler head carried by said frame for, during normal operation of said apparatus, delivering a strand of sliver coiled into a sliver can then disposed beneath said coiler head; said strand, after filling of said sliver can and during movement thereof from said apparatus, being fixedly held at said coiler head and extending therefrom to the upper surface of a mass of coiled sliver previously delivered into and then extending resiliently upwardly from said sliver can; and can changing means for, during movement of said sliver can from said apparatus, moving said sliver can away from said coiler head along a predetermined path of travel; the improvement comprising:

sliver separating means for constraining withdrawal of said sliver strand from said sliver mass during movement of said sliver can along said path of travel thereof, and for thereby causing attenuation and separation of strand during and in response to said movement of said sliver can;

said sliver separating means including a roll member; and

mounting means mounting said roll member closely above said path of travel of said sliver can for engagement of said roll with said sliver mass and with said sliver strand during said movement of said sliver can along said path of travel thereof, and for free rotation of said roll about its central axis under the impetus of said engagement and said movement;

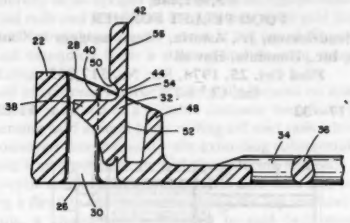
said roll imposing a compressive force upon said sliver strand during its said engagement therewith, and said roll having fluting means thereon for also then imposing upon said strand a snubbing force acting in conjunction with said compressive force and can movement to constrain, attenuate and part said strand.

3,991,444
RELEASABLE CABLE TIE

Michael S. Bailey, Palos Hills, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

Filed Feb. 18, 1976, Ser. No. 659,174
Int. Cl.² B65D *63/02*
U.S. Cl. 24—16 PB **10 Claims**

1. A releasable cable tie for forming a plurality of elongate objects such as wires into a bundle, said cable tie comprising an elongate strap and a locking head, said head including a strap entry face, a strap exit face, a strap-receiving aperture extending between said faces and having a predetermined strap pass path therethrough, and a locking pawl extending into said aperture and toward said strap exit face for holding said strap, said pawl being movable between a release position wherein it is adjacent said strap exit face and disposed outside of the strap pass path and an engagemnt position wherein said pawl is disposed adjacent said strap entry face and securely holds said strap, said cable tie further including a fulcrum and a release arm extending from said pawl comprising a generally rigid lever and a generally flexible hinge joining said lever to said pawl, a portion of said lever adjacent said hinge being

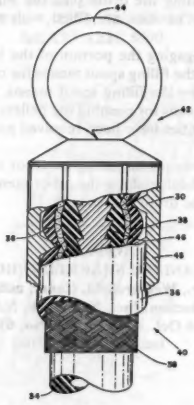


engagable with the fulcrum when the pawl is in its engagement position whereby the operator by applying force to the distal end of said lever is provided with a mechanical advantage thereby facilitating movement of the pawl towards its strap-releasing position.

3,991,445
LOCKING CABLE FOR SECURING PORTABLE OBJECTS SUCH AS BICYCLES

Phillip E. Pennell, Lakewood, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed June 18, 1973, Ser. No. 371,313
Int. Cl.² F16G *11/02*; E05B *73/00*
U.S. Cl. 24—73 A **8 Claims**



1. A flexible locking cable comprising in combination:

an inner hollow elongated flexible body made of a heat setting polymeric material;

an outer cover made of a heat setting resilient polymeric material disposed exteriorly of the inner body;

metal reinforcement interposed and sandwiched between the inner body and outer cover, said reinforcement having an outer surface which is in intimate engaging contact with the outer cover and said inner body having flowed into intimate contact with the metal reinforcement;

loop means secured to the ends of the cable for receiving detachable locking means to join the ends of the cable together to form an endless loop; and

coupling means joining said cable to said loop means including a corrugated shank of substantially uniform outer diameter axially disposed within the ends of the inner

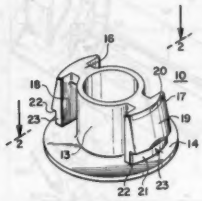
body, and ferrule means disposed concentrically of said shank and contracted against the outer cover to tightly secure the cable from longitudinal displacement, said shank being integral with said loop means.

3,991,446

ONE PIECE KNOCK-OUT PLUG

Thomas Mooney, Mount Sinai, and Stephen Veselaski, Shirley, both of N.Y., assignors to I-T-E Imperial Corporation, East Farmingdale, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,015
Int. Cl.² F16C 1/10; H01B 17/26; B65D 11/26
U.S. Cl. 24—73 P 7 Claims



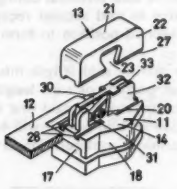
1. A plug device integrally formed of a synthetic organic polymeric resin and comprising a longitudinally extending core section, a transversely outwardly enlarged head section located at the rear of said core section, a plurality of peripherally spaced outwardly projecting arms extending from the front of said core section, and a locking section located at the free end of and of peripherally greater width than each of said arms and having an outwardly rearwardly outwardly flaring conical outside face coaxial with said core, the rear outer edge of each of said locking sections being recessed along the periphery thereof to provide a rearwardly facing outer peripheral shoulder and an outwardly facing peripheral shoulder extending to the rear end of the respective locking section.

3,991,447

SLIDER FOR SLIDING CLASP FASTENER

Shunji Akashi, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed July 8, 1975, Ser. No. 594,023
Claims priority, application Japan, July 17, 1974, 49-82005
Int. Cl.² A44B 19/30
U.S. Cl. 24—205.14 R 2 Claims



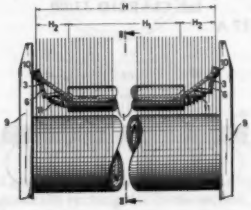
1. In a slider for a sliding clasp fastener having a slider body with an upper shield and a lower shield, a pull tab, and a yoke, the improvement which comprises the yoke having an upper portion and a pair of opposed side walls depending from said upper portion, each of said side walls having a generally uniform thickness down to a lower edge, and the upper shield of the slider body having a plurality of elongated longitudinally extending grooves directed upwardly out of the surface of said upper shield with each disposed to receive a corresponding lower edge of said side walls, said lower edges and upper shield being integrally fused together at said grooves to connect said yoke to the upper shield of the slider body.

3,991,448

TRAVERSING DEVICE FOR WINDING A THREAD BUNCH ON A WARP BEAM

Jürgen Kracke; Hans-Peter Miemietz; Wilfried Derichs; Werner Richer, and Johann Stadelmann, all of Monchen-Gladbach, Germany, assignors to Gebruder Sucker, Monchen-Gladbach, Germany

Filed Feb. 23, 1976, Ser. No. 660,177
Claims priority, application Germany, Feb. 22, 1975, 2507750
Int. Cl.² D02H 13/18
U.S. Cl. 28—37 10 Claims



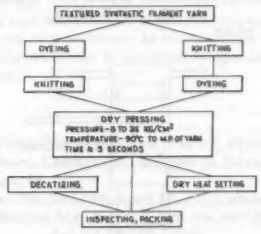
1. Traversing device for winding a thread bunch on a warp beam having respective beam discs at the ends thereof comprising comb means extending along the entire length of the warp beam that is to be wound by the thread bunch, said comb means comprising a relatively long middle comb and two relatively short end combs located, respectively, at opposite ends of said middle comb, said end combs having a multiplicity of comb needles and being pivotable relative to said middle comb so as to execute a traversing stroke reducing in direction toward the respective beam disc.

3,991,449

PROCESS FOR FINISHING TEXTURED KNITTED FABRICS

Kazutomo Ishizawa, Osaka, and Yoshio Sawa, Kobe, both of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan

Filed June 9, 1971, Ser. No. 151,469
Int. Cl.² D06C 15/00, 27/00
U.S. Cl. 28—72 R 7 Claims



1. A process of treating a primary knitted fabric to obtain a treated knitted fabric having the appearance and hand of a woven fabric, comprising:

uniformly dry pressing a primary knitted fabric consisting essentially of a thermoplastic, synthetic, textured filament yarn with a smooth flat presser face under a pressure of from 5 to 35 Kg/cm² applied substantially at a right angle with respect to the surface of said primary knitted fabric,

and simultaneously heating the fabric to a temperature between 90° C and the melting point of said thermoplastic yarn for a period of time not less than 5 seconds and effective for setting the treated knitted fabric in a thickness of from 95 to 55% of the original thickness of the knitted fabric, so that the treated knitted fabric has a porosity of at most 80% and at least one surface having a surface contour of at most 6.

3,991,450

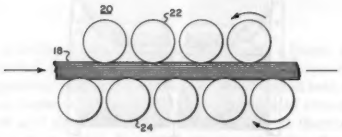
METHOD OF SEPARATING APERTURED SHADOW MASK FLATS AFTER ANNEALING

James A. Burnham, Lowman, and James O. Frey, Horseheads, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1975, Ser. No. 585,912

Int. Cl.² B21D *33/00*

U.S. Cl. 29—17 A **1 Claim**



1. Method of separating an annealed stack of thin, planar, shadow mask flats, each flat being approximately 0.006 inch thick and having a plurality of apertures provided through the body thereof, comprising the steps of arranging two series of rollers one above the other and alternating the rollers of one series with the rollers of the other series so that each roller in said one series is disposed between two rollers in said other series, spacing apart the two series of rollers by a distance which is approximately 0.015 inch less than the stack distance, and feeding said stack of flats between said series of rollers while they are being rotated, whereby a flexure of the stack of flats occurs which permits easy separation of the individual flats after they have passed through the rollers.

3,991,451

METHOD OF MAKING A FLUORIDE FILM CAPACITOR

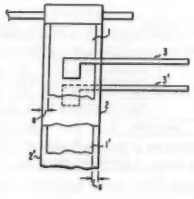
Toshiro Maruyama; Matsuo Hirosawa, both of Nagai; Hajime Ishii, Iwaki, and Hiroaki Sato, Nishiki, all of Japan, assignors to Tokyo Denki Kabushiki Kaisha, Nagai and Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, both of, Japan

Continuation of Ser. No. 864,115, Oct. 6, 1969, abandoned. This application Dec. 13, 1971, Ser. No. 207,236

Claims priority, application Japan, Oct. 4, 1968, 43-71805

Int. Cl.² H01G *13/02*

U.S. Cl. 29—25.42 **3 Claims**



1. The method of forming a wound flat capacitor comprising the steps of (1) forming a dielectric film and electrode means into a wound capacitor element, the dielectric film comprising a polyvinylidene fluoride film which has been elongated in at least one direction and subsequently heat treated (2) subjecting the capacitor element to a pressure of from 15 to 35 kilograms per square centimeter of film width and (3) allowing the element to stand for at least 5 minutes at a temperature of from 60° C to 130° C.

3,991,452

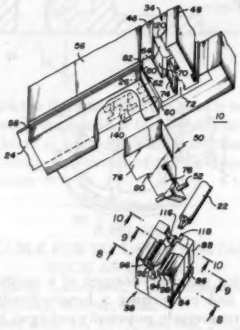
APPARATUS FOR FORMING A DISCONNECT TERMINAL

Irwin Zahn, New York, and Renate Rosenberg, Forest Hills, both of N.Y., assignors to General Staple Company, Inc., New York, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,170

Int. Cl.² H01R *43/04*

U.S. Cl. 29—33 M **24 Claims**



1. Apparatus for forming and crimping a disconnect terminal from a supply band having a continuous first portion and a plurality of second portions spaced therealong and integrally connected to said first portion; said apparatus comprising:

first means for shearing said continuous first portion of said supply band at a location intermediate two adjacent second portions thereof to form a predetermined length of said supply band into a predetermined shape having a terminal portion and an integrally connected connector portion;

second means for bending said length into a generally U-shaped configuration;

a die having a first and second receptacle therein; said first receptacle having a first predetermined configuration for the reception of at least one wire therein, said second receptacle having a second predetermined configuration established by a male form positioned therein for forming said terminal portion of said length into a preselected terminal configuration, said male form being the conplementary shape of said terminal configuration and being movable relative to said second receptacle from a first position to a second position to form said terminal portion; and

third means for driving said length into said die whereby said connector portion of said length will be crimped about said wire received in said first receptacle and said terminal portion of said length will be formed into said preselected terminal configuration in said second receptacle.

3,991,453

SPINDLE DRIVES FOR MULTI SPINDLE LATHES

Harold James Gilbert, Coventry, England, assignor to Wickman Machine Tool Sales Limited, Coventry, England

Filed Dec. 2, 1974, Ser. No. 528,790

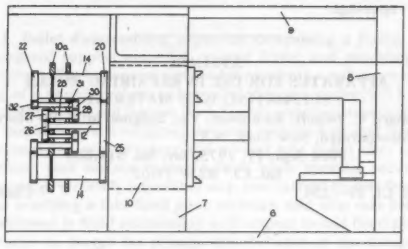
Claims priority, application United Kingdom, Dec. 6, 1973, 56566/73

Int. Cl.² B23P *23/00*

U.S. Cl. 29—37 R **1 Claim**

1. A spindle drive for work spindles rotatably mounted in a spindle drum (10) of an eight spindle lathe consisting of a

main shaft, (12) a single input gear (26) mounted on said main shaft, eight work spindles (14) disposed on a pitch circle, the centre of which coincides with the axis of said main shaft, (12) two gears (27) drivingly engaged with said single gear, (25) two shafts (28) inwardly of said pitch circle on which said two gears (27) are mounted respectively, respective further gears (29) mounted on the two shafts (28) in spaced relationship from said two gears (27) within said pitch circle, respectively, four still further gears (30) meshing with said further gears (29), four further shafts (31) on which said still



further gears (30) are mounted respectively, and four yet further gears (32) mounted on said four further shafts in spaced relation from said still further gears, (30) respectively, each of said, last-mentioned yet further gears (32) being drivingly engaged with two respective gears (22) of said work spindles (14), said two shafts (28) and said four further shafts (31) being of different lengths so that said input gear (26) and said two gears (27) are disposed in a transverse plane axially spaced from a transverse plane in which said yet further gears (32) and said two respective gears (22) are disposed.

3,991,454

FLUTE PIECES FOR ENGINEERS TOOLS

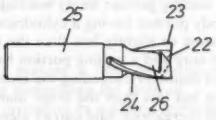
Dennis Harry Wale, Rothley, England, assignor to Marwin Cutting Tools Limited, Rothley, England

Filed Feb. 10, 1975, Ser. No. 548,364

Claims priority, application United Kingdom, Feb. 11, 1974, 06179/74

Int. Cl.² B26D *1/12*

U.S. Cl. 29—105 R **8 Claims**



1. An engineer's rotary tool for working ferrous and non-ferrous metals, plastics, and wood comprising an elongated flute piece having a longitudinal axis of rotation and formed entirely of tungsten carbide, said flute piece having at least two helical cutting edges symmetrical about said axis, an elongated shank having an extension web on one end thereof, said web having a slot formed transversely therethrough, said slot being helical and symmetrical about said axis and complementary to said helical cutting edges, and one end portion of said flute piece being engaged in said slot.

3,991,455

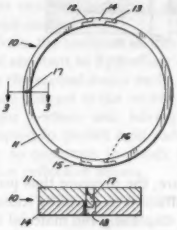
COUPLED PISTON RING METHOD OF MANUFACTURE

Alfred Bergeron, 1288 Bagley, Lot 6, Dallas, Tex. 75211

Continuation-in-part of Ser. No. 242,588, April 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 185,274, Sept. 30, 1971, abandoned. This application Mar. 7, 1974, Ser. No. 449,043

Int. Cl.² B23P *15/08*

U.S. Cl. 29—156.6 **7 Claims**



1. A method for fabricating a piston ring assembly including the steps

forming first and second split compression ring members of uniform, generally rectangular cross-section, with parallel planar side surfaces, and with a cylindrical peripheral outer edge surface, dimensioned for side-by-side mating relation;

finishing the mating side surfaces of said ring members to be fully contiguous in assembled mated relation, to effect a seal between said ring members;

forming circumferentially overlapping, radially contiguous tongues in the ends of each ring member, with radially confronting sealing surface to provide radially sealed joints;

forming an index tab integral with said first ring member by deforming a portion of the ring material, intermediate its ends and intermediate its edges, to produce a boss projecting generally perpendicularly from its mating side surface and having a sharp intersection with said side surface; said boss having a small transverse cross-section relative to the edge-to-edge width of said member;

forming a recess in the mating side surface of said second ring member, intermediate its ends and intermediate its edges, dimensioned to receive and surround said boss with limited lateral clearance, to permit limited relative sliding movement of said first and second ring members in side-by-side relation; said recess having a small transverse crossj-section relative to the edge-to-edge width of said member;

positioning said boss and said recess, on said respective first and second ring members, to maintain the joints of the mated ring members in rotationally spaced relation to each other.

3,991,456

METHOD OF FORMING VALVE BODIES

Mathias J. Lieser, Chicago, Ill., assignor to Stanray Corporation, Chicago, Ill.

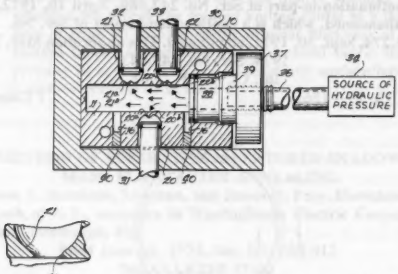
Division of Ser. No. 242,589, April 10, 1972, abandoned. This application May 6, 1974, Ser. No. 467,008

Int. Cl.² B23P *15/00*

U.S. Cl. 29—157.1 R **7 Claims**

1. A method of forming a valve body comprising the steps of: forming a valve body member, forming an interior chamber within said valve body member, forming a partial bore into a side wall of the valve body member, said bore terminating at a predetermined distance from a wall of said interior chamber of the valve body member, applying pressure to the interior chamber of the valve body member, and blowing a hole

through that portion of said wall of said interior chamber of the valve body member immediately behind the terminating



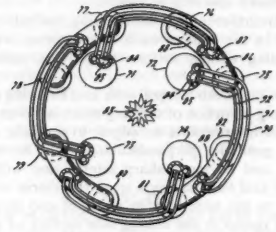
end of said partial bore, the pressure thus provided for blowing the hole being sufficient to inwardly round the peripheral edges of the hole by displacing the material therefrom.

3,991,457

HEATER TUBE ARRANGEMENTS

David W. Barton, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 466,653, May 3, 1974, Pat. No. 3,965,976.
This application Nov. 4, 1974, Ser. No. 520,689
Int. Cl.² B23P *15/26*
U.S. Cl. 29—157.3 R **2 Claims**



1. A method of manufacturing a heater head assembly of the type useful in a hot gas engine where a labyrinth of heat-exchange passages provide a closed connection for trapped gas to reversibly communicate between a high temperature working chamber and a thermal regenerator, said labyrinth of tubes selectively receiving heat from a surrounding heated medium, the method comprising:

a. preparing cast metallic headers with one suitable for connection to one or more working chambers and a second suitable for connection to one or more regenerators, each header being characterized by a cylindrical tube an integral wall separating the interior of said tube into first and second portions, said tube being supported with the tube axis in an upright orientation,

b. preparing tube bank each adapted for connection at opposite sides thereof to said one and second headers, each bank having two plys of highly heat conductive sheet metal joined together along spaced pairs of lines, said preparation including forming a tube passage between every other pair of lines by exerting fluid pressure therein causing the portion of said plys between a pair of lines to expand and define a cylindrical passage, punching elongated and separated perforations between each pair of lines having unexpanded ply portions to provide freedom for the surrounding medium to flow crossways through said bank, and

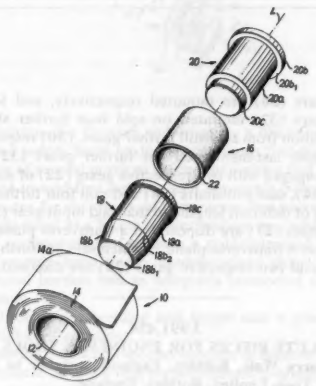
c. providing at least three rows of openings along the axial extent of each header, each row to receive the ends of one bank of expanded passages for conducting gas thereto, two rows of said openings being in communication with the first portion of said header and the third row being in communication with the second portion of said header, said first portion of each header being sealed to prevent communication with either said working chamber or regenerator, said tube ends of each tube bank being sealed to said headers while disposed in a row of openings one tube bank having the tube ends thereof connected at one side to the portion of one header having said two rows of openings and the other side connected to the portion of the other header having one row of openings.

3,991,458

APPARATUS FOR USE IN REPAIRING ROLLS SUPPORTING WEB MATERIAL

Richard C. Donoff, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,084
Int. Cl.² B23P *19/02*
U.S. Cl. 29—234 **7 Claims**



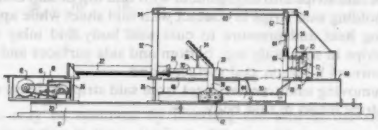
1. Apparatus for substituting, for a tubular core assembled with web material wound radially thereabout, a replacement core of the same dimensions as said tubular core, said apparatus comprising an elongate fixture having longitudinally aligned mandrel and core carrier elements, said mandrel element having a leading portion freely insertable in such assembled core, a body portion having a cylindrical outer surface of diameter the same or slightly less than the inner diameter of said assembled core and a trailing portion having a cylindrical outer surface of diameter exceeding the inner diameter of said assembled core but less than the inner diameter of said web material wound thereabout, said carrier element being separably stackable on said mandrel element and having a body portion with a cylindrical outer surface of diameter the same or slightly less than the inner diameter of said assembled core and a trailing portion of diameter exceeding the inner diameter of said assembled core whereby said replacement core may be received circumferentially on said carrier element body portion prior to stacking of said carrier element on said mandrel element, said mandrel trailing portion displacing said assembled core from said wound web material and said carrier element trailing portion displacing said replacement core interiorly of said wound web material upon longitudinal translation of said fixture into said wound web material.

3,991,459

PALLET DISASSEMBLING APPARATUS

Kenneth K. Rapp, R.D. No. 1, Phillipsburg, N.J. 08865

Filed Dec. 10, 1975, Ser. No. 639,401
Int. Cl.² B23P 19/04
U.S. Cl. 29—252 10 Claims



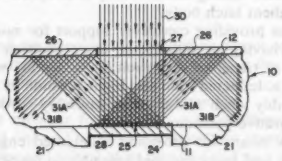
1. Pallet disassembling apparatus comprising a frame, an elongated support mounted on said frame and providing a relatively flat horizontal surface for receiving a pallet consisting of a plurality of spaced parallel stringers connected by a plurality of top and bottom deck boards arranged transversely of said stringers, a reciprocatory ram mounted on said frame for engaging said stringers and moving said pallet over said surface, said surface having a fixed plate member secured thereto, a vertically adjustable stop ram carried by said frame and overlying a said fixed plate member, said stop ram being positioned in fixed relationship with respect to said fixed plate member to permit the passage therebetween of the stringers of said pallet upon the movement of said ram over said surface, said stop ram and fixed plate member engaging the deck boards of said pallet to effect their removal from said stringers.

3,991,460

METHOD OF MAKING A LIGHT ACTIVATED SEMICONDUCTOR CONTROLLED RECTIFIER

John S. Roberts, Export, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 392,698, Aug. 29, 1973, Pat. No. 3,920,495, which is a continuation-in-part of Ser. No. 248,451, Sept. 28, 1972, abandoned. This application Mar. 25, 1975, Ser. No. 561,732
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² B01J 17/00
U.S. Cl. 29—578 10 Claims



1. A method of making a light activated semiconductor controlled rectifier comprising the steps of:

A. sequentially providing in a silicon semiconductor body, having first and second opposed major surfaces, impurities to form in the body four regions of alternate type conductivity disposed alternately through the body between the major surfaces with a PN junction between each region, the two regions adjoining the major surfaces being emitter regions and the two intermediate regions being base regions;

B. masking all surfaces except first major surface of the semiconductor body with a material resistant to hydrofluoric acid;

C. preparing an etchant solution by forming a first solution by admixing predetermined amounts of chromium trioxide and water, and adding to said first solution just prior to use predetermined amounts of a given hydrofluoric acid solution;

D. immersing the masked semiconductor body in the etchant solution for a preselected period of time, while agitating the solution relative to the body, to form light radiation reflecting etch pits in at least a portion of the first major surface;

E. forming on the first major surface a first electrode making contact to the emitter region adjoining the first major surface and having an opening therethrough corresponding to a light radiation reflective means for the body on the first major surface;

F. removing from the surfaces of the semiconductor body the material resistant to hydrofluoric acid;

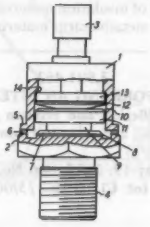
G. forming on the second major surface a second electrode making ohmic contact to the emitter region adjoining the second major surface and having an opening therethrough adapted to permit light radiation of preselected wavelengths to penetrate the body and reflect from the light radiation reflective means.

3,991,461

ENCAPSULATED SEMICONDUCTOR DEVICES

Thomas Alexander Anderson, London, England, assignor to Westinghouse Brake & Signal Company Limited, England

Filed Feb. 18, 1976, Ser. No. 658,885
Claims priority, application United Kingdom, Mar. 21, 1975, 11877/75
Int. Cl.² B01J 17/00
U.S. Cl. 29—588 6 Claims

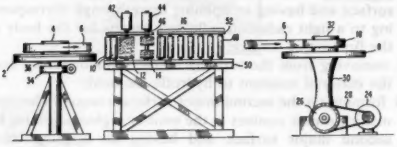


1. A method of constructing a semiconductor device in the form of an encapsulated semiconductor element wherein the element is included in a stack with contact members and a resiliently compressible member, the stack being compressed within and between two parts of an encapsulation housing, the method comprising the steps of including in the stack a first additional component which can plastically deform under a compressive force greater than the compressive force necessary to flatten the resiliently deformable member, and initially also including a second additional component of a fixed predetermined thickness, placing the stack of the semiconductor element, the contact members, the resiliently compressible member, and the first and second additional components within and between the two parts of the encapsulation housing, forcing the two parts of the housing together and into their relative positions as in a finished device whereby to compress the stack, flatten the compressible member, and plastically deform the first additional component by a certain extent, subsequently separating the two parts of the housing and removing the second additional component, and then finally bringing the two housing parts together again around its stack and sealing the two housing parts together such that the stack is compressed with the compressible member partly flattened and exerting a compressive force on the stack within a predetermined range of compressive forces, the correctness of this compressive force being determined by the thickness of the first additional component after it has been permanently thinned by plastic deformation during the initial compression of the stack.

3,991,462
METHOD AND APPARATUS FOR PROCESSING METALLIC STRIP MATERIAL

George F. Engel, Trenton, N.J., assignor to Stonite Coil Corporation, Yardville, N.J.

Filed Oct. 28, 1975, Ser. No. 619,271
Int. Cl.² H01F 41/06
U.S. Cl. 29—605 25 Claims

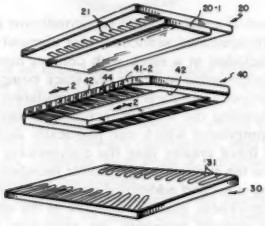


15. A method for processing metallic strip material comprising:
a. feeding unprocessed metallic strip material;
b. bending metallic strip material about small bending diameters to free material from the surfaces thereof;
c. brushing the surfaces of the metallic strip material to strip away foreign substances;
d. scraping the surface of the metallic strip material with abrasion surfaces to remove undesired substances therefrom;
e. straightening and flattening the metallic strip material including all sides, surfaces, and edges; and
f. winding the fully processed strip material; and
g. applying a layer of insulation material between circumferential layers of metallic strip material.

3,991,463
METHOD OF FORMING AN INTERCONNECTOR

Vincent Squitieri, Billerica, and William Joseph Lynn, Groveland, both of Mass., assignors to Chomerics, Inc., Woburn, Mass.

Filed May 19, 1975, Ser. No. 578,935
Int. Cl.² H02G 15/00
U.S. Cl. 29—629 3 Claims

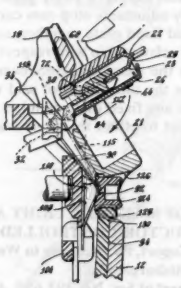


1. The method of forming an interconnector having a row of electrically conductive flexible plastic strips inlaid in the top, bottom, and two side surfaces and the corners between said surfaces of a rectangular cross-section solid electrical insulator body of elastomeric material, said strips being spaced apart from each other and electrically isolated from each other, the method comprising the steps of:
a. forming a row of a plurality of uncured flexible electrically conductive plastic strips on one side of a single foldable transfer sheet and at least partially curing said strips;
b. placing the transfer sheet at least partially in a mold cavity having two sides and a bottom with the side of the transfer sheet opposite to the side supporting the strips in engagement with the sides and bottom of the mold cavity;
c. placing a rectangular cross-section insulator body of at least partially cured elastomeric material on said transfer sheet while said transfer sheet is in said mold cavity so that each of said strips engages said bottom and side surfaces of said body;
d. folding said sheet over the top of said body to bring each of said strips into engagement with said top of said body;
e. holding said strips in contact with said sheet while applying heat and pressure to cure said body and inlay said strips in said body top, bottom and side surfaces and the corners between said surfaces; and
f. removing said transfer sheet from said strips to leave said strips inlaid in said body.

3,991,464
LATCH AND RELEASE FOR A TRIMMER DEVICE IN AN ELECTRIC DRY SHAVER

Richard Ihasz, Milford, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,615
Int. Cl.² B26B 19/10
U.S. Cl. 30—34.1 11 Claims



1. An improved trimmer device for an electric dry shaver having a main cutter head supported on a casing comprising:
a. a trimmer cutter assembly;
b. means for mounting said assembly for rotatable movement of said assembly between inoperative and operative positions on said shaver;
c. means for biasing said assembly to an operative position;
d. a resilient latch body;
e. means providing cantilever support for said body, said body having an undeflected home position located in a path of travel of said rotatable assembly whereby said body is deflected from said home position by said trimmer assembly when said trimmer assembly is rotated to said inoperative position;
f. catch means for providing a detented engagement between said body and said assembly to maintain the latter in its inoperative position; and
g. release actuating means contacting the latch body and operable for deflecting the body for disengaging said catch means whereby the assembly is released to said biased operative position.

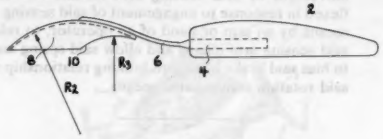
3,991,465
ORANGE PEELER

Shirley Cross, P.O. Box 3098, Morgantown, W. Va. 26505

Filed Mar. 3, 1976, Ser. No. 663,634
Int. Cl.² A22B 5/16
U.S. Cl. 30—123.7 1 Claim

1. An orange peeler comprising a handle and a bowl-shaped body carried by the handle, said body having a transverse radius of curvature less than the longitudinal radius of curvature and having a cut-away back edge, and a longitudinally extending edge on the front portion, the corner joining the

cut-away back portion and the longitudinal edge being sharpened to permit slitting the rind of an orange, whereafter the



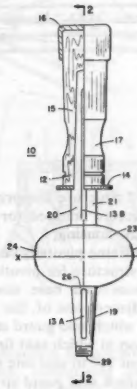
rind may be removed by inserting the tool in the slit and manipulating it, the outer face of the bowl being substantially unobstructed.

3,991,466

DUAL PURPOSE SPOON AND OYSTER KNIFE

Howard H. Smith, Montreal, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 9, 1976, Ser. No. 656,655
Int. Cl.² B26B *11/00;* **A22C** *29/00*
U.S. Cl. 30—149 **4 Claims**



1. A utensil for opening the shell of an oyster, cutting the oyster from attachment to the shell, and lifting the oyster out of the shell, comprising

a blade member fixed to a handle member,

said blade member formed with a spoon-shaped section joined at one end to a shank section that terminates as a knife edge and joined at its opposed end to a shank section fixed to the handle member, with an edge of a side section of the spoon-shaped section formed with serrated teeth.

3,991,467

CARPETING TRIMMER

Kiyofumi Yokoyama, No. 83, Nakazaki, Kita, Osaka, Japan

Filed Sept. 3, 1975, Ser. No. 610,004
Int. Cl.² B26B *1/08, 3/08*
U.S. Cl. 30—293 **11 Claims**

1. A device for trimming carpet comprising:

a main body portion having a channel extending therethrough comprised of:

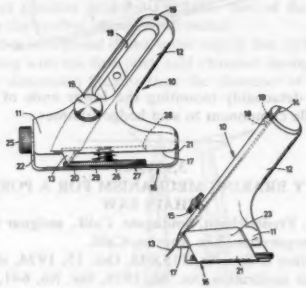
a flat-bottomed base, and

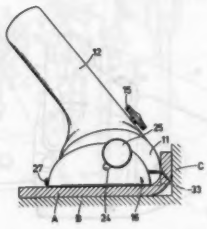
a grip portion integrally formed with and extending upward at an angle from said base, said grip portion containing said channel therein;

a cutting blade slidably fitted in said channel and extensible therefrom at an acute angle to the bottom of said base;

first retaining means connected to said channel for retaining said blade in said channel;

a base plate slidably mounted on said body portion and extending below the bottom of said base, said base plate being slidable toward and away from the bottom of said base with the front edge thereof continuously positioned behind the front edge of said base;





second retaining means operatively connected to said base of said main body portion and said slidable base plate for retaining said base plate in the desired position relative to said base; and

disc means threadably mounted perpendicular to the bottom of said base between said base and said base plate for supporting said base plate away from said base.

3,991,468

HEDGE TRIMMER HANDLE ATTACHMENT

Marvin P. Williams, 88525 Perrywinkle Road, Springfield, Oreg. 97477

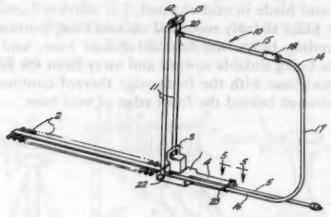
Filed Oct. 10, 1975, Ser. No. 621,301
Int. Cl.² B26B *27/00*
U.S. Cl. 30—298 **2 Claims**

1. A handle attachment for a powered hedge trimmer of the type having a reciprocating blade and a motor housing, said attachment permitting stand up use of the trimmer during brush clearing, said handle attachment comprising,

a first handle component comprisng elongate parallel members extending upwardly from the trimmer motor housing and mutually terminating upwardly in a cross piece to provide a handhold for a trimmer operator at a elevated distance above the motor housing,

a second handle component carried by said first handle component, said second handle component including upper and lower members, said upper member terminating forwardly in attachment to one of said parallel mem-

bers, said lower member terminatng forwardly in attachment to the other of said parallel members, and



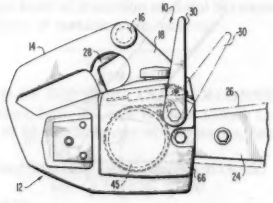
means detachably mounting the lower ends of said first handle component to said hedge trimmer.

3,991,469

SAFETY BRAKING MECHANISM FOR A PORTABLE CHAIN SAW

Robert E. Frederickson, Southgate, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Continuation of Ser. No. 515,045, Oct. 15, 1974, abandoned. This application Dec. 16, 1975, Ser. No. 641,159
Int. Cl.² B23D *57/02*
U.S. Cl. 30—381 **9 Claims**



1. In a manually portable chain saw having housing means; manual gripping handle means mounted on said housing means; engine means carried by said housing means; a cutting chain; support bar means projecting forwardly from said housing means for supporting said cutting chain for endless movement; rotation transmitting means operably connected to said engine for driving said cutting chain; and safety braking means for stopping said cutting chain, said safety braking means comprising:

sensing arm means mounted on said housing means for swinging movement;

said sensing arm means being located adjacent said gripping handle means and arranged to be swung in response to being engaged by an arm or hand of an operator;

said sensing arm means including a projection extending therefrom;

a flexibie brake band including a first end anchored to said housing means and a second end coupled to said sensing arm means for movement therewith such that as said arm means is swung, it shifts said brake band into frictional braking relationship with said rotation transmitting means to stop said cutting chain; and

multi-stage brake control means including:

spring means constantly biasing said sensing arm means toward swinging movement to brake said rotation transmitting means, and

a latch for releasably retaining said sensing arm means, said

latch comprising a strip having first and second ends;

said first end being fixedly secured to said housing;

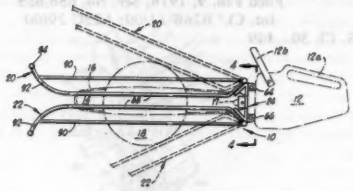
said second end being configured to flexibly receive said projection so as to normally resist forward movement of said sensing arm means, and to be flexed in response to engagement of said sensing arm means by an arm or hand of an operator, to release said sensing arm means and allow said spring means to bias said brake band into braking relationship with said rotation transmission means.

3,991,470

CHAIN SAW GUARD STRUCTURE

William Glenn Cartmill, Pauls Valley, Okla., assignor to Charles R. Musgrave, III; E. L. Jackson and William Cartmill, all of Pauls Valley, Okla., part interest to each

Filed Jan. 22, 1976, Ser. No. 651,611
Int. Cl.² B27B *17/02*
U.S. Cl. 30—382 **16 Claims**



1. A chain saw guard structure comprising:

a two-part base structure adapted for detachable securement to a chain saw housing;

an elongated first subframe pivotally connected at one of its ends to said base structure for pivoting from a first position extending from said base structure substantially parallel to, and adjacent one of, the runs of the blade of a chain saw upon which said guard structure is mounted, to a second position in which said first subframe extends at an angle of about 90° to said one run of the blade of a chain saw upon which said guard structure is mounted;

an elongated second subframe pivotally connected at one of its ends to said base structure for pivotation about an axis extending substantially parallel to the pivotal axis of said first subframe, and pivotable from a first position extending from said base structure substantially parallel to said first subframe and on the opposite side of said chain saw blade from said first subframe, to a second position in which said second subframe extends at an angle of about 90° with respect to the first described position of said second subframe; and

means for resiliently biasing said first and second subframes from their respective second positions to their respective first positions.

3,991,471

HUMIDIFYING PALATE

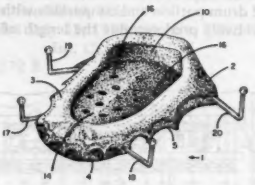
Donald F. Hoops, 2205 Paradise Road, Las Vegas, Nev. 89105

Filed July 14, 1975, Ser. No. 595,554
Int. Cl.² A61C *19/00*
U.S. Cl. 32—1 **4 Claims**

1. A palatal appliance for maintaining humidity in the mouth of a wearer comprising:

a rigid plastic shell having an upper surface shaped to fit the hard palate and a smooth lower surface, said upper surface having a shallow recess therein,

an absorbent sponge wedge mounted in the recess and having a volume of at least 0.6 cubic centimeters, and

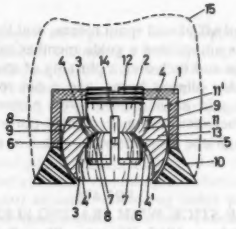


fastening means carried by the shell for releasably attaching the shell to the hard palate of the wearer.

3,991,472
DENTURE

Friedrich Lukesch, Ernest Thun Strasse 9, Salzburg, Austria (A-5020)

Filed Aug. 4, 1975, Ser. No. 601,338
Claims priority, application Austria, Aug. 12, 1974, 6601/74
Int. Cl.² A61C *13/00*
U.S. Cl. 32—9 **7 Claims**



1. A denture construction for anchoring an artificial tooth in a person's mouth, comprising an anchoring member adapted to be fixed in the mouth and having a bore therethrough with an intermediate small diameter bore portion and an outwardly tapered bore portion on each end of the small diameter bore portion, a substantially cylindrical pin having an outer end with securing means for fixing the pin to an artificial tooth and having an intermediate small diameter pin portion and being widened outwardly toward each end, said pin having an inner end opposite to said outer end which is wider than said small diameter bore portion and having a slot therethrough adjacent said inner end permitting portions on each side of the slot to be sprung together to permit the inner end to be engaged into said anchoring member beyond the small diameter bore portion.

3,991,473
WATER RETRACTOR

Ward Morgan, Foster City, Calif., assignor to Health Kit Corporation, Burlingame, Calif.

Filed Oct. 23, 1974, Ser. No. 517,134
Int. Cl.² A61C *19/02*
U.S. Cl. 32—22 **13 Claims**

1. Apparatus for retracting water from the water supply line of a dental tool having a control valve, said apparatus comprising:

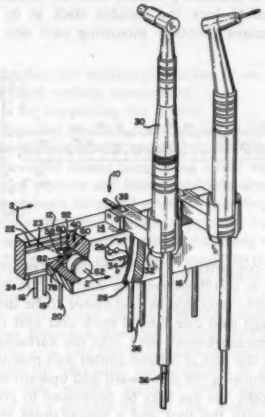
a piston cylinder having first and second ports in one end connected to the water supply line so that water flowing through the water supply line to the tool flows into the cylinder through the first port and out of the cylinder through the second port and to the tool;

means for supplying a pressurized gas to the other end of the cylinder upon actuation of the control valve;

a piston axially translatable within the piston cylinder and conformed to the sides of the cylinder to separate the water in one end of the cylinder from the pressurized gas at the other end of the cylinder, said piston being translated to a first positon adjacent said one end of the cylinder when the control valve is actuated by the pressurized gas;

means for biasing the piston from said first position to a second position adjacent the other end of the cylinder when the control valve is deactuated;

a chamber interposed in the water supply line and communicating with the first port, said chamber having a transverse dimension greater than the diameter of said first port;



a ball confined within the chamber and having a diameter greater than the diameter of the first port, the water pressure in said chamber adapted to normally seat the ball against the first port to prevent the flow of water to the cylinder through said first port; and a pin fixed to the piston and adapted to extend through the first port when the piston is in said first position to unseat the ball and allow water to flow into the cylinder through the first port and out of the cylinder through the second port and to the tool, said pin having a preselected length so that partial translation of the piston from the first position to the second position allows the ball to seat against the first port to prevent the flow of water to the cylinder and further translation of the piston toward said second position retracts water from the water supply through the second port and into the cylinder.

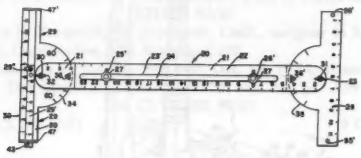
3,991,474
MEASUREMENT TOOL

Lonnie Milo Rath, Baker, Mont. 59313

Filed June 12, 1975, Ser. No. 586,183
Int. Cl.² B43L *7/06*
U.S. Cl. 33—98 **1 Claim**

1. A measurement tool comprising a first pair of elongated measurement sticks connected together in adjustable telescoping relation to slide longitudinally toward and away from one another; a pair of secondary laterally elongated stick means; means pivotally mounting each of said lateral stick means centrally of their length to one of the respective outer remote ends of the first pair of elongated sticks; said laterally elongated stick means being shorter in length than said first

pair of elongated sticks, said lateral stick means having half moon center portions with angular markings thereon to identify the angle of each lateral stick means relative to the respective first elongated stick; one of said laterally elongated stick means comprising a pair of elongated spaced parallel members; lateral straps fixing the parallel members together in spaced parallel relation at their outer ends; a slidable marking stick being slidable in between said parallel stick member; with said parallel stick member having grooves to receive said marking stick; locking means on said marking stick; said slidable marking stick having a hole adjacent its outer end to receive a pencil point, said slidable stick and said parallel stick members of said one laterally elongated stick means having measurement marking to measure the distance from the hole at the outer end of the slidable section to the center of the parallel sticks whereby the slidable stick may be telescoped relative to the parallel stick to project the outer end of the slidable stick with the hole therein, to place the hole on the slidable stick at a selected position, and the locking means may be activated to lock the slidable stick at its selected distance; said means pivotally mounting said one laterally



elongated stick comprising a sleeve pivotally mounting said one lateral stick to its respective first elongated measurement stick; a pin slidably mounted in said sleeve to be depressable to project through said one lateral stick and said respective first elongated measurement stick into the surfaces beneath the tool to keep the tool at a fixed center axis position on the surface; means limiting the downward and upward movement of the pin, whereby the pin may be depressed to project into the surface beneath the tool and a pencil point may be inserted into the hole of the slidable stick, with the slidable stick in the adjusted locked position and the slidable stick and the parallel stick members of said one lateral stick means may be pivoted about said pivotal mounting to said respective first measurement stick at said fixed center axis position on the surface, so that the pencil may draw a circle upon surfaces beneath the slidable stick with the circle having a radius depending upon the adjustment of the one slidable stick relative to the parallel stick members of the one laterally elongated stick means within the pin projecting into the surface beneath the tool to keep the tool at a fixed center axis position while drawing the circle on the surface about the center point.

3,991,475

DEPTH SELECTING SPOOL DEVICE

Steven F. Segrest, and James E. Preston, both of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

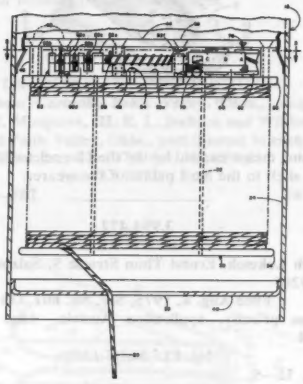
Filed Dec. 5, 1975, Ser. No. 637,995
Int. Cl.² G01B *3/00*
U.S. Cl. 33—126.5 **7 Claims**

1. A spooling device for paying out a predetermined length of line selected from a plurality of available lengths, said device comprising:

spool means for holding in coiled condition a line of a predetermined overall length, said spool comprising a drum portion and first and second flanges fixed at opposite ends of said drum portion, one of said flanges having an opening therethrough;

a line of said predetermined overall length wound on said spool means; said line having a plurality of loops formed therein, each at a predetermined location along the overall length thereof, said loops extending through said opening in said one flange; and

line length selector means, mounted on said one of said flanges of said spool means on the side thereof remote from said drum portion and cooperable with said loops so as to selectively predetermine the length of line that can



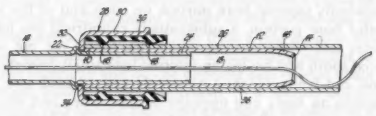
be spooled off of said spool means, said line length selector means comprising a guide member mounted on said one flange and including a plurality of spaced guide portions having aligned bores, and a pin reciprocably disposed in said aligned bores with portions of said pin exposed between said spaced guide portions and extending through one loop between each two spaced guides.

3,991,476

DIP STICK WITH SEALING SLEEVE

Walter E. Haines, 1865 Wingate, Bloomfield Hills, Mich. 48013

Filed Oct. 10, 1975, Ser. No. 621,371
Int. Cl.² G01F *23/04*
U.S. Cl. 33—126.7 R **10 Claims**



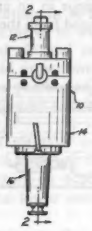
1. A dip stick assembly of the type received in an access tube, said assembly comprising: a handle member including an arcuate portion and a straight portion, an elongated fluid-level indicating member attached to said handle member, abutment means on the surface of said straight portion spaced from the end thereof, a sealing sleeve surrounding a portion of said straight portion below said abutment means in mechanical gripping engagement therewith and extending beyond the end thereof, a cap member including a skirt portion surrounding a portion of said sealing sleeve and extending toward the outer end thereof and an inwardly extending flange portion captured between said abutment means and inner end of said sealing sleeve; said sealing sleeve has an outer diameter slightly less than the inner diameter of the access tube, thereby establishing close fitting engagement between said sealing sleeve and the access tube to hold the dipstick assembly in place and to at least partially seal the access tube.

3,991,477

PROBE FOR A COORDINATE MEASURING MACHINE

Richard B. Zipin, Dayton; John E. Hart, Kettering, and John W. Grass, Middletown, all of Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Filed July 22, 1975, Ser. No. 598,512
Int. Cl.² G01B 7/31
U.S. Cl. 33—172 E 4 Claims



1. A probe support arrangement for a displacement transducer, said transducer including a grid grating and an index optical grating to be supported for relative movement in parallel planes while remaining in a fixed rotative orientation with respect to each other, the probe support arrangement including:

a grid support structure including grid post elements and a pair of spaced grid members connected to each other by said grid post elements extending therebetween;

an index support structure including index post elements and a pair of spaced index members connected to each other by said index post elements extending therebetween, one of each of said grid and index members interposed between the other pair of the grid or index members so that said grid and index support structures are linked to each other by said respective post elements;

said grid and index gratings affixed to a respective one of opposing surfaces formed on one of an interposed grid or index members and one one of a non-interposed grid or index members so that said grid and index gratings are in juxtaposition with respect to each other, a grid V-bridge member secured so as to be stationary with respect to said probe and extending between said interposed grid and index members, one of said interposed grid or index members abutting said grid V-bridge member and fixed thereto;

a cross slide assembly including cross slide bearing means interposed between the other of said interposed grid or index members and abutting said grid V-bridge member providing limited relative movement between said other of said grid or index members and said grid V-bridge in a plane parallel to said grid and index grating while maintaining a fixed rotative orientation therebetween;

thrust bearing means interengaging the other of said noninterposed grid or index members and said one of said interposed grid or index members whereby in cooperation with said cross slide bearing means relative movement of said grid and index support structures in directions transverse to said plane is prevented while allowing said movement in said parallel plane;

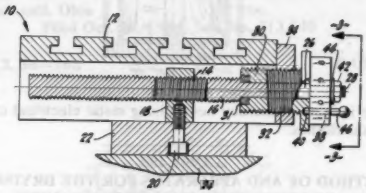
whereby said limited movement is accommodated while said index and grid supports and said grid V-bridge are thereby maintained position with respect to each other.

3,991,478

MECHANISM FOR LOCATING AN OBJECT

Edward P. Stone, 4362 Whittle Ave., Oakland, Calif. 94602

Filed May 27, 1975, Ser. No. 581,125
Int. Cl.² G01B 5/00; B23Q 3/18; G01B 3/18
U.S. Cl. 33—174 TA 1 Claim



1. Mechanism for accurate location of an object with respect to a fixed surface, comprising:

a. means for supporting the object;

b. first threaded means for moving said supporting means in a axial direction with respect to the fixed surface, said first threaded means comprising a first member having a threaded portion and being rotatable about its axis, said first member's threaded portion threadingly engaging an internally threaded bushing supported by the fixed surface, said first member's rotation causing axial movement of said supporting means with respect to the fixed surface,

c. second threaded means for moving said supporting means in a direction co-axially with respect to said first threaded means, said second threaded means comprising a second member having a threaded portion and being rotatable about its axis, said threaded portion threadingly engaging an internally threaded collar affixed to said supporting means, said second member circumjacently disposed relative to a portion of said first member, said second member upon rotation thereof being axially movable with respect to said supporting means;

d. means for selectively rotating only said first threaded means or both said first and second threaded means, wherein in the later case the leads of said first and second threaded means are summed such that said supporting means, and the object thereof move a distance equal to said sum of the leads of said first and second threaded means, said means for selectively rotating includes means for detachably rotatably connecting said second member to said first member;

e. said means for selectively rotating including a dial representing the axial distance traveled by said first threaded means in the English system of measurement, said leads of said first and second threaded means being predetermined such that a numerical representation of an axial distance traveled by said first threaded means in the English system of measurements corresponds to the same numeral representing an axial distance in the metric system of measurements traveled by said first and second threaded means as a result of the summing of said leads.

3,991,479

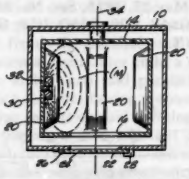
CLOTHES DRYER WITH ANTI-STATIC MAGNET

Michael Dionne, 2117 Lenore Drive, West Bend, Wis. 53095

Filed Nov. 7, 1975, Ser. No. 629,944
Int. Cl.² F26B 3/34, 11/02
U.S. Cl. 34—1 6 Claims

1. In a rotary clothes dryer having a rotatable dryer drum in which clothes are tumbled while they dry, the improvement comprising means for producing a non-alternating magnetic field within said dryer drum which is free to act on said clothes

through an unshielded space through which said clothes tumble to induce electrical currents in said clothes by electromagnetic induction, thereby neutralizing static electrical charges in said clothes.



3,991,480

METHOD OF AND APPARATUS FOR THE DRYING OF ODORIFEROUS ORGANIC SUBSTANCES

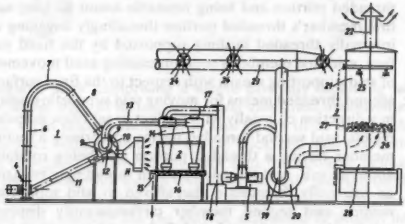
Wilhelm Menge, Isernhagen FB, Germany, assignor to Sudoldenberger Tierfrischmehl-Anlagen GmbH & Co., KG, Nordlohne, Germany

Filed May 27, 1975, Ser. No. 580,941

Claims priority, application Germany, May 25, 1974, 2425445; Apr. 21, 1975, 2517527

Int. Cl.² F26B *3/10*

U.S. Cl. 34—10 **28 Claims**



1. A method of processing malodorous animal and vegetable wastes, such as feces feathers, hair, remains from slaughtering carcasses and the like comprising the steps of introducing the malodorous wastes into a ring-shaped piping system having a turbulence mechanism, circulating air flow through the piping system for drying the malodorous wastes, directing the air flow discharged from the ring-shaped piping system and containing the dried wastes to a separating device, separating the air flow from the dried wastes, reacting the air flow with a sprinkling bed for a period of from about 1 to 9 seconds to remove substantially all the odor from the air flow and discharging to atmosphere the essentially odorless air flow from the sprinkling bed.

3,991,481

PROCESS FOR RECOVERING VOLATILE ORGANIC LIQUIDS

George R. Coraor, Wilmington; Harold L. Jackson, Hockessin, and Frederick W. Mader, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,570

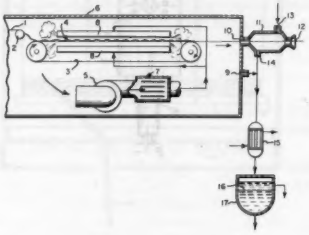
Int. Cl.² F26B *3/04*

U.S. Cl. 34—28 **13 Claims**

1. Energy saving process for substantially quantitatively removing and recovering a volatile, organic, water-immiscible wetting liquid from a solid material which is wet therewith, which process comprises:

a. contacting the wet solid material with superheated vapor of a volatile, organic, water immiscible stripping liquid to vaporize the wetting liquid and produce a mixture comprising superheated stripping liquid vapor and wetting liquid vapor, said stripping liquid having a specific heat less than about 0.6 calorie/gram/° C. at about 250° C. and a latent heat of vaporization less than about 100 calories/gram, said stripping liquid vapor being at a temperature above the boiling point of the wetting liquid and said contacting being carried out in the absence of a substantial amount of gas which cannot be condensed in (d); and thereafter

b. contacting the wet solid material with the vapor mixture produced in (a), while maintaining constant in the system the amount of superheated vapor of stripping liquid, until the solid material is substantially free of wetting liquid and contains organic vapor on its surfaces and/or occluded in its interstices, said maintaining of the amount of superheated vapor of stripping liquid being effected by removing organic vapor in an amount equivalent to the organic liquid vaporized from the wet solid material in (a) and in this step;



c. displacing the solid-containing organic vapor of (b) with dry steam, which is at a temperature sufficient to avoid substantial condensation thereof on the solid material, to produce a mixture of organic vapor and steam;

d. condensing the mixture of organic vapor and steam from (c) to produce a liquid, organic water-immiscible phase and a liquid water phase, and thereafter separating the two phases; and

e. recovering solid material which is substantially free of wetting liquid, stripping liquid and vapor of wetting liquid and stripping liquid.

3,991,482

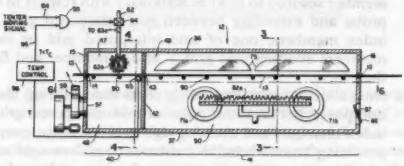
SUPERHEAT APPARATUS FOR DRYING TEXTILE PRODUCTS

James Donald Brock, and Erbie Gail Mize, both of Chattanooga, Tenn., assignors to Astec Industries, Inc., Chattanooga, Tenn.

Division of Ser. No. 499,577, Aug. 22, 1974, Pat. No. 3,955,287. This application Feb. 24, 1976, Ser. No. 660,809

Int. Cl.² F26B *19/00*

U.S. Cl. 34—48 **2 Claims**



1. Dryer apparatus for drying a porous textile product and the like, comprising:

a substantially enclosed housing having a front wall and a back wall;

a product entry opening defined in said front wall and a product exit opening defined in said back wall;

means defining a predetermined path for the movement of product within said housing from said inlet opening to said exit opening;

first means positioned in said housing above said path and dividing the portion of the housing above the path into an upper exit zone adjacent said back wall and an upper

entry zone adjacent said front wall;

second means positioned in said housing below said path and dividing the portion of the housing below the path into a lower exit zone adjacent said back wall and a lower entry zone adjacent said front wall;

air recirculation means in air flow communication with said lower and upper exit zones for maintaining recirculating air flow in a first air flow path including withdrawing air from said lower exit zone and supplying said withdrawn air to said upper exit zone for passage through a product in said predetermined path and return to the lower exit zone;

first heating means positioned in said first air flow path for heating the recirculating air in the first air flow path;

air passage means operative to withdraw a portion of said recirculating heated air and connected to supply said withdrawn air to said upper entry zone;

second heating means positioned to heat said withdrawn portion of air supplied by said air passage means to said upper entry zone;

air exhaust means in air flow communication with said lower entry zone for drawing said heated air from said upper entry zone through a product in said predetermined path, into the lower entry zone, and out of said housing;

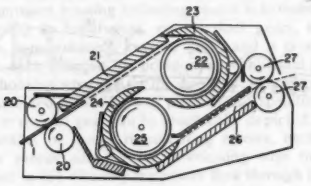
sensing means responsive to the magnitude of a variable parameter which is affected by the temperature attained by said product while passing along said lower and upper entry zones to provide an output indicative of the temperature of such product; and

control means controlling the operation of said additional heating means and operative in response to the output of said sensing means to terminate operation of said second heating means when said variable parameter becomes a predetermined magnitude.

3,991,483
PHOTOGRAPHIC COPYING APPARATUS

Wilhelm Knechtel, Biebertal; Gerhard Petersdorf, Pohlheim, and Winfried Sandner, Rechtenbach, all of Germany, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 303,001, Nov. 2, 1972, Pat. No. 3,878,622.
This application Apr. 21, 1975, Ser. No. 569,611
Int. Cl.² F26B *13/26*
U.S. Cl. 34—95 **3 Claims**

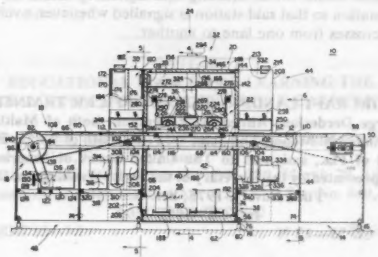


1. A device for drying and fixing a toner image on copy material comprising: a drying chamber having an entrance and an exit, first and second heating means each having an inner concave surface in said chamber for supporting said copy material and having an outer surface, first and second guiding rollers disposed respectively adjacent said concave surfaces, said guiding rollers having a non-smooth surface to assist the transportation of said copy material, said concave surfaces being disposed so that said copy material may pass from one to the other thereof, whereby said copy material travels between said first guiding roller and its respective concave surface and said second guiding roller and its respective concave surface, a pair of opposed rolls sealing the entrance of said chamber operative to direct said copy material to pass between said first concave surface and said first guiding roller, and a pair of opposed rolls sealing the exit of said chamber operative to receive said copy material from between said second concave surface and said second guiding roller, said outer surfaces of said first and second heating means forming at least portions of the outer surface of said drying chamber.

3,991,484
MACHINE FOR DRYING PRINTED MATTER BY ULTRAVIOLET RADIATION

John K. Lamb, and Edward H. Jones, both of Cincinnati, Ohio, assignors to Cincinnati Printing and Drying Systems, Inc., Cincinnati, Ohio

Filed Oct. 10, 1974, Ser. No. 513,540
Int. Cl.² F26B *13/02*
U.S. Cl. 34—162 **10 Claims**

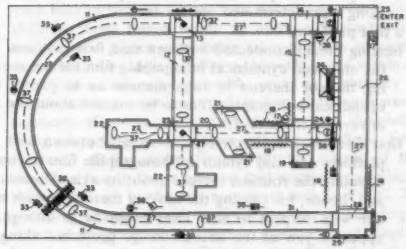


1. In a machine for irradiating articles, the combination of an irradiation chamber, a conveyor having a course extending beneath the irradiation chamber for conveying the articles beneath the irradiation chamber, an irradiator support frame in the irradiation chamber above the conveyor, a plurality of irradiation lamps mounted on the irradiator support frame spaced along the irradiator support frame in the direction of conveyor movement, means for mounting the irradiator support frame for raising and lowering to control the distance between the lamps and the articles on the conveyor, the means for mounting the irradiator support frame including independent end support means at an input end and at an output end, means for raising and lowering the end support means at the input end and at the output end independently for controlling the slope of the irradiator support frame so that the intensity of irradiation is varied along the path of conveyor movement, and means mounted on the irradiator support frame for directing air against the articles on the conveyor to hold the articles on the conveyor and to cool the articles.

3,991,485
DRIVING TEST RANGE

Stephen S. Golenski, New Milford, Pa., assignor to The Singer Company, Binghamton, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,264
Int. Cl.² G09B *11/02*
U.S. Cl. 35—11 **12 Claims**



1. A system for automatically testing the ability of individual drivers to drive motor vehicles, said system comprising:

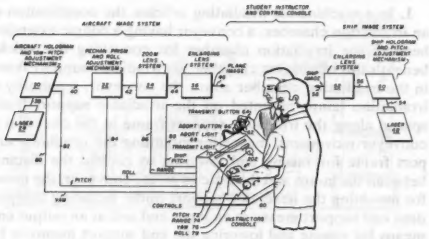
a. a first roadway upon which motor vehicles may be driven;
b. vehicle presence detectors located around said first roadway at known spaced positions;
c. transmitter means adapted to be carried by vehicles using said first roadway for transmitting unique signals to be received by said presence detectors;
d. a central control station to which all of said presence detectors are connected;
e. means at said station for identifying individual presence detectors so that the location of a vehicle on said first roadway is readily determined; and
f. means for separating said first roadway into two parallel lanes, said separating means including signalling means, and means for connecting said signalling means to said station so that said station is signalled whenever a vehicle crosses from one lane to another.

3,991,486

AIRCRAFT LANDING SIGNAL OFFICER TRAINER

George Derderian; Alfred H. Rodemann, both of Maitland; Windell N. Mohon, and John W. Pease, both of Winter Park, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 7, 1975, Ser. No. 630,126
Int. Cl.² G09B 9/00
U.S. Cl. 35—12 N **7 Claims**



1. An aircraft landing signal officer trainer, comprising in combination:

a holographic film having a diffraction grating therein which defines a three-dimensional image of an aircraft, said holographic film being cylindrical in geometrical configuration, having at least one open end, and being rotatable about the axis of revolution thereof;

a laser for producing and projecting a continuous laser beam, said laser being spatially disposed from said cylindrical holographic film in such manner as to project the laser beam produced thereby through the open end thereof and to and through the diffraction grating therein, so as to illuminate a predetermined portion thereof and, hence, cause an image of said aircraft at a certain apparent pitch and yaw attitude to be projected therefrom along a predetermined optical axis;

a first platform;

bearing means connected between said first platform and the aforesaid cylindrical holographic film for the mounting thereof thereon in such manner as to permit said cylindrical holographic film to be rotated about the axis of revolution thereof;

first drive means effectively connected between said first platform and said cylindrical holographic film for timely effecting the rotation thereof about its axis of revolution and, hence, for causing the moving thereof in such manner with respect to said laser beam as to change the apparent yaw of the aircraft image projected along the aforesaid predetermined optical axis;

a second platform slidably supporting the aforesaid first platform in such manner that said cylindrical holographic film effectively mounted thereon may be moved back and forth along the axis of revolution thereof;

second drive means connected between said second and first platforms for timely effecting slidable relative movement therebetween and, hence, for causing said cylindrical holographic film to be moved in such manner with respect to said laser beam as to change the apparent pitch of the aircraft image projected along the aforesaid predetermined optical axis;

a rotatable pechan prism spatially disposed from said cylindrical holographic film in the path of the aforesaid aircraft image projected therefrom along said predetermined optical axis;

a third drive means effectively connected to said rotatable pechan prism for effecting the rotation thereof in such manner as to change the apparent roll of the aircraft image passing therethrough;

adjustable zoom lens means spatially disposed from said rotatable pechan prism and on the aforesaid predetermined optical axis;

a fourth drive means effectively connected to said zoom lens means for effecting the adjusting thereof in such manner as to vary the size of the aircraft image passing therethrough and, hence, for effecting an apparent change in the range of the image of the aircraft being projected along the aforesaid predetermined optical axis; and

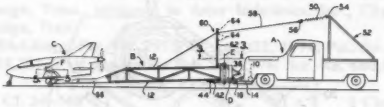
means spatially disposed from said zoom lens means and on the aforesaid predetermined optical axis for magnifying the aircraft image received therefrom.

3,991,487

FLIGHT TRAINING ASSEMBLY

James R. Bede, c/o Bede Aircraft, Inc., P.O. Box 706, Newton, Kans. 67114

Continuation of Ser. No. 506,117, Sept. 16, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,984
Int. Cl.² G09B 9/08
U.S. Cl. 35—12 R **19 Claims**

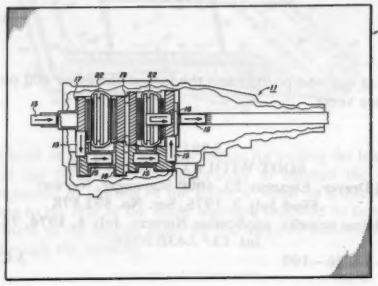


1. A flight training assembly comprising a winged aircraft having pilot operable flight controls, a ground supported vehicle behind said aircraft with respect to the direction of flight thereof, said vehicle being movable along the ground at a speed to achieve lift of said aircraft, boom means, means mounting said boom means on said vehicle for pivotal movement relative to said vehicle about a horizontal boom axis extending laterally of said vehicle and about a vertical boom axis, universal joint means pivotally interconnecting said aircraft with said boom means substantially at the center of gravity of said aircraft, said universal joint means supporting said aircraft for pivotal movement relative to said boom means about a first horizontal aircraft axis extending laterally of said aircraft, a second horizontal aircraft axis extending longitudinally of said aircraft and a vertical aircraft axis, and means limiting pivotal movement of said boom means relative to said vehicle and pivotal movement of said aircraft relative to said boom means.

3,991,488
EDUCATIONAL DEVICE FOR LEARNING PRINCIPLES OF STANDARD TRANSMISSION

Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 345,949, March 29, 1973, abandoned. This application Dec. 27, 1973, Ser. No. 428,982
Int. Cl.[2] G09B *25/02*
U.S. Cl. 35—13 **8 Claims**



1. An educational kit programmed for teaching the operation of a standard transmission comprising in combination:

a. a simulator board having a surface of magnetically attractive material and having specific graphic indicia on the surface thereof defining a schematic sectional view of an automobile transmission housing, the indicia on said simulator board being as shown by the non-numerical indicia of FIG. 1;

b. a plurality of magnetically attractive manipulative pieces each individually bearing on their surfaces graphic indicia defining items relating to the subject matter of standard transmissions, said pieces comprising (i) a plurality of pieces containing indicia defining the names of various portions of said sectional view of the transmission housing, said pieces adapted for positioning within the confines of the simulator board for identifying various portions of said transmission housing; (ii) a plurality of pieces adapted for positioning within the confines of said transmission housing including pieces schematically representing an input gear, countershaft gears, mainshaft gears, synchronizers, reverse gear, and a reverse idler shaft, each adapted for positioning within said transmission housing whereby the proper gear arrangements that are involved in the flow of power for a specific forward gear or reverse gear can be graphically depicted; and (iii) a plurality of pieces representing arrows, each of said arrow pieces adapted for positioning with the pieces defined in (ii) whereby the power flow through the transmission when engaged in a particular gear arrangement can be graphically depicted; said magnetically attractive board or alternatively each of said magnetically attractive pieces being magnetic to provide a mutual attraction between said board and said pieces, the indicia on said manipulative pieces being as shown by the non-numerical indicia of FIG. 3;

c. a display board for said manipulative pieces including a sheet of magnetically attractive material, said display board having graphic indicia on a surface thereof in spaced relationship, said graphic indicia corresponding to the indicia present on each of said manipulative pieces, said manipulative pieces adapted for storage on and removal from said display board; and

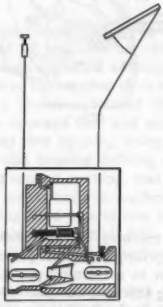
d. audio-visual instructional means for presenting information relevant to the operation of a standard transmission including information defining the indicia on said pieces and the indicia on said simulator board, whereby (i) various parts of a standard transmission can be properly identified, (ii) the proper location of the gears in a standard transmission when in position for first, second, third, fourth or reverse gear can be properly determined and simulated and (iii) the power flow through the transmission for a specific foward gear or for reverse gear may be simulated, by positioning and manipulating said pieces on said simulator board in response to said instructional means;

said audiovisual instruction means having visual and audio instructional portions terminating in audio directions to the user of the kit to perform a manipulative activity using said simulator board, said instruction means stopping upon completion of said audio directions and being restartable by the user upon completion of said manipulative activity.

3,991,489
EDUCATIONAL DEVICE FOR LEARNING THE FUNDAMENTALS OF AN AUTOMOTIVE CARBURETOR SYSTEM

Charles Glenn Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 345,920, March 29, 1973, abandoned. This application Apr. 12, 1974, Ser. No. 460,418
Int. Cl.[2] G09B *25/02*
U.S. Cl. 35—13 **8 Claims**



1. An educational kit programmed for teaching the assembly, relationship of parts, and operation of an automotive carburetor system comprising:

a. a simulator board having a surface of magnetically attractive material and including graphic indicia on the surface thereof defining a schematic diagram of an automotive carburetor system including a float bowl, a carburetor body, an air horn, a throttle linkage, an accelerator pedal, a fuel line and a fuel pump, the indicia on said simulator board being as shown by the non-numerical indicia of FIG. 1;

b. a plurality of magnetically attractive manipulative pieces each bearing individually on their surfaces graphic indicia defining items found within an automotive carburetor system, said pieces comprising (i) a plurality of pieces each containing indicia defining elements found within an automotive carburetor assembly; and (ii) a plurality of pieces each containing word indicia defining various segments of an automotive carburetor system, the pieces being adapted for manipulation v ithin the confines of the elements of the automotive carburetor system of the simulator board, the indicia on said manipulative pieces being as shown by the non-numerical indicia of FIG. 3;

c. a display board for said manipulative pieces including a sheet of magnetically attractive material, said display board having graphic indicia on a surface thereof in spaced relationship, said graphic indicia corresponding to the indicia present on each of said manipulative pieces,

said manipulative pieces adapted for storage on and removal from said display board; and

d. audiovisual instructional means for presenting information relevant to the basic principles about automotive carburetor systems including information defining (i) the elements of the automotive carburetor system on the simulator board, (ii) the indicia on the manipulative pieces, (iii) the indicia on said board, (iv) the relationship of the indicia on the simulator board to the indicia on said pieces and use of same on said board whereby the assembly, relationship of parts, and operation of an automotive carburetor system can be learned by the user by using said board in response to said instructional means.

3,991,490

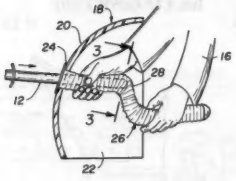
TEACHING AID FOR SIGMOIDOSCOPE AND THE LIKE

H. David Markman, 56 Marshall Road, Yonkers, N.Y. 10705

Filed Apr. 9, 1973, Ser. No. 349,202

Int. Cl.² G09B *23/30*

U.S. Cl. 35—17 **1 Claim**



1. An aid for teaching the placement of a sigmoidoscope and the like comprising a manikin presenting an outer surface in facing relation to a learning participant and bounding a rearwardly facing teaching compartment in facing relation to a teaching participant, a flexible simulated bowel and the like operatively connected to extend supported only at one end from said manikin into said teaching compartment so as to be substantially masked from the view of said learning participant by said manikin and in limp condition requiring support in the length portion within said teaching compartment, wherein said flexible simulated bowel comprises a pair of telescoped tubular members, the inner member thereof having simulated lesions therealong and the outer tubular member including a helical wire to contribute structural strength thereto without inhibiting the flexuring of said simulated bowel, and a teaching relation operatively established between said teaching and said learning participants by the support of said simulated bowel in a selected configuration in the hands of said teaching participant, whereby the efficacy and progress of said learning participant in the placement of a sigmoidoscope in said simulated bowel is conveyed by feelings communicated to said teaching participant.

3,991,491

MASTER SLIPPER

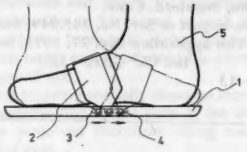
Ming Der Huang, 2nd Fl. No. 9-1, Lane 100, Bao Jinn Rd., Chung-Ho, Taipei, Taiwan, China /Taiwan

Filed Oct. 23, 1975, Ser. No. 625,006

Int. Cl.² A43B *3/12*

U.S. Cl. 36—11.5 **1 Claim**

1. A foot slipper comprising a sole having identical end portions and a center portion with a groove on both sides thereof and a strap having its ends pivotably mounted in said grooves for movement along the length of said grooves and forming a loop so that the slipper can be worn either with the



heel at one end portion and the toes at the other end portion or vice versa.

3,991,492

BOOT WITH EXTENSION LEG

Paul Dreyer, Eiganesv 23, 4000 Stavanger, Norway

Filed July 2, 1975, Ser. No. 592,678

Claims priority, application Norway, July 4, 1974, 742433

Int. Cl.² A43B *00/00*

U.S. Cl. 36—109 **3 Claims**

1. A boot having an extension leg of the type constituting a waterproof and preferably permanent extension of the boot leg, said extension leg being made of a thin and easily rollable material, wherein a peripheral passage is provided at the free end opening of the extension leg, said passage slidably receiving a strip-like element made of a flexible material, for facilitating uniform rolling down of the extension leg and simultaneous adaption thereof to the upper opening diameter of the boot leg.

3,991,493

FLOOR STRUCTURE FOR EARTHMOVING SCRAPER

Edward G. Orth, Peoria, Ill., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

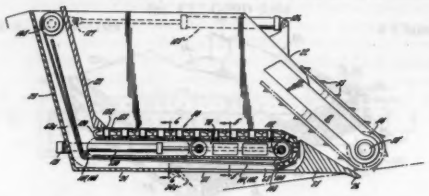
Filed Sept. 8, 1975, Ser. No. 611,506

Int. Cl.² B60P *1/36*

U.S. Cl. 37—7 **17 Claims**

1. A scraper for earth moving purposes, the combination comprising an open-fronted bowl structure formed of a pair of laterally spaced vertical side sheets, defining a bowl a blade base having a blade at the front edge of the bowl, a tractor supported draft frame, positioning means for supporting the bowl with respect to the draft frame so that the blade cuuts into the ground at a predetermined level, a horizontally shiftable frame normally occupying the space rearwardly of the blade base, means for supporting the shiftable frame for movement rearwardly from the normal position, flexible floor structure for supporting the load of soil and extending in its normal position from a trailing end at the rear of the bowl forwardly over the shiftable frame and downwardly about the front end

of the frame through an angle of substantially 180° to form a loop having a leading end, said flexible floor structure being movable and having anti-friction means on its underside, an ejector plate secured to the trailing end of the floor structure and extending substantially vertically between the side sheets



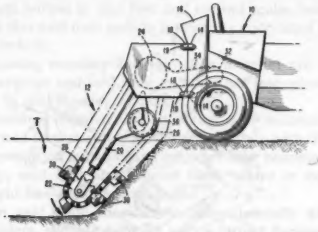
at the back of the bowl, actuator means for pulling the leading end of the floor structure rearwardly to shorten the loop accompanied by shifting of the frame to open up a discharge opening to the rear of the blade base and followed by forward movement of the ejector plate for discharge of the contained soil through the opening.

3,991,494

CONVEYOR ATTACHMENT FOR SPOILS REMOVAL FROM A TRENCH DIGGING MACHINE

Kenneth W. Schuermann, and David R. Bazzell, both of Perry, Okla., assignors to The Charles Machine Works, Inc., Perry, Okla.

Filed Jan. 23, 1975, Ser. No. 543,470
Int. Cl.² E02F *5/06*
U.S. Cl. 37—90 **9 Claims**



1. A trench digging machine comprising:

a powered vehicle having thereon support means for detachably mounting a trench digger on said vehicle;

a conveyor attachment frame having separate connection means at spaced positions on said frame, one of said connection means matingly cooperating with said support means to separably secure said frame on said vehicle by said support means;

a trench digger having mounting means which is removably fastened to said attachment frame by said mounting means matingly cooperating with the other of said connection means on said attachment frame to physically dispose said frame between said vehicle and said digger, said mounting means being matingly cooperable with said support means for directly separably mounting said digger on said vehicle by connection of said mounting means to said support means in the absence of said attachment frame;

a spoils removal conveyor carried by said frame, said conveyor being positioned on said frame to extend transversely of the digger and be disposed to receive earthen type spoils removed by said digger and convey them laterally remote from the trench being dug; and

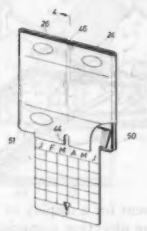
said digger having attaching means thereon to detachably mount a spoils removal auger on said digger for the auger to move spoils laterally from the trench being dug when said spoils removal conveyor is not present.

3,991,495

INFORMATION DEVICE FOR FACILITATING MERCHANDISE INVENTORY CONTROL

Bobby G. Wilson, 2404 Avenue H, Rosenberg, Tex. 77471

No Drawing. Filed Dec. 4, 1974, Ser. No. 529,280
Int. Cl.² G09F *11/30*
U.S. Cl. 40—64 R **8 Claims**



1. An inventory information device for facilitating merchandise inventory control to maintain an optimum supply of merchandise for efficient operation of merchandising establishments, said inventory information device comprising:

a housing having a chamber formed therein and being formed to define opposed first and second openings to said chamber, said first opening being larger than said second opening, said housing defining stop elements on either side of said second opening, said housing defining a display surface means and rear surface means;

retention means being fixed to said rear surface means for retaining said housing in assembly with the front portion of a merchandise display shelf of a merchandising establishment;

an inventory information element being received in movable relation within said chamber of said housing and being linearly movable from a retracted position, where said element is substantially fully received within said chamber of said housing, to an extended position, where said inventory information element is moved at least partially through said second opening and is at least partially extended from said housing exposing indicia present on said element, said inventory information element having a body portion of smaller dimensions than the dimension of said second opening allowing said body portion to pass through said second opening and having extension portions on opposed portions of said body and cooperating with said body portion to define a stop portion of larger dimension than the dimension of said second opening and of smaller dimension than the dimension of said first opening, said stop portion being receivable within said first opening and defining opposed stop shoulders disposed for engagement with said stop elements in the fully extended position of said inventory information element;

an information element access opening is defined by said housing;

a portion of said inventory information element is exposed by said information element access opening in the retracted position of said information element; and

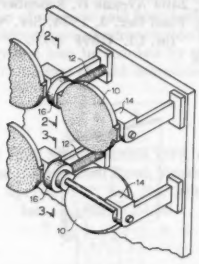
an aperture being formed in said exposed portion of said inventory information element, said aperture being adapted to receive a movement implement for moving said inventory information element to said extended position relative to said housing.

3,991,496

GRAVITY BIAS FOR DISPLAY ELEMENTS

Gordon Helwig, Toronto, and Donald Winrow, Weston, both of Canada, assignors to Ferranti-Packard Limited, Toronto, Canada

Filed July 31, 1975, Ser. No. 600,281
Int. Cl.² G09F *11/00*
U.S. Cl. 40—28 C **2 Claims**



1. A rotatable element for a display or indicator defining a predetermined viewing direction comprising:
a relatively thin disc, contrastingly coloured on opposite sides,
the disposition of said disc defining a median plane,
means for pivotally mounting said disc on a support defining a pivotal axis therefore approximately parallel to such median plane,
a magnet mounted for rotation with said disc defining a magnetic polar axis having its major component transverse to said axis of rotation,
said disc, magnet and members rotating therewith defining a disc assembly,
said disc assembly being designed so that the centre of gravity thereof is eccentric relative to said pivotal axis,
stop means allowing rotation of the disc only between a first and second limiting position separated by greater than 90° and less than 180°, said first position corresponding to an orientation of said median plane substantially perpendicular to said viewing direction,
said disc assembly being so designed that said eccentricity in either stopped position of the element tends to move the rotatable element toward the other stopped position in the allowable direction of rotation,
and means for providing a reversible magnetic field exterior to said element designed in opposite senses to rotate said disc to opposite ends of said range of movement.

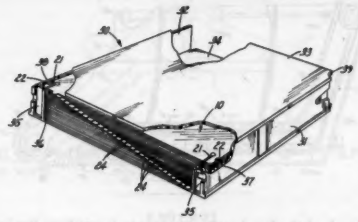
3,991,497

INFORMATION STORAGE MEANS

Ben Howard Owens; Clyde Eugene LeFevre, both of Orange, and James Patrick Hagan, Laguna Beach, all of Calif., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 464,977, April 29, 1974, abandoned, which is a division of Ser. No. 95,770, Dec. 7, 1970, Pat. No. 3,807,074. This application May 8, 1975, Ser. No. 575,509
Int. Cl.² G09F *11/30*
U.S. Cl. 40—78 **4 Claims**

1. Storage means for holding a plurality of microfiche comprising the combination of a magazine having oppositely disposed side walls each formed with magazine detent means on the inner surface thereof, a top, a bottom and a front wall having a window therein, the back of said magazine being open, and a plurality of microfiche carriers within said magazine, each of said microfiche carriers having pocket means adapted to carry a microfiche, index means and carrier detent means, said index means projecting into said window and said carrier detent means matingly engaging said magazine detent means, whereby said plurality of microfiche carriers are held securely in place within said magazine and pushing said index means of a selected microfiche carrier through said window releases the carrier detent means of said selected microfiche carrier from said magazine detent means so that said selected microfiche carrier can be retrieved through the open back of said magazine.

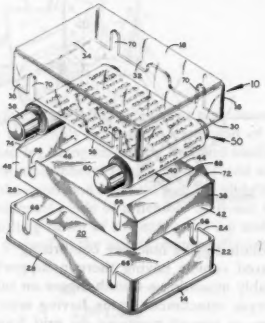


3,991,498

LEARNING AID

William R. C. Beach, 4421 NW. 4th Court, Fort Lauderdale, Fla. 33317

Filed Mar. 10, 1976, Ser. No. 665,856
Int. Cl.² G09F *11/24*
U.S. Cl. 40—86 R **8 Claims**

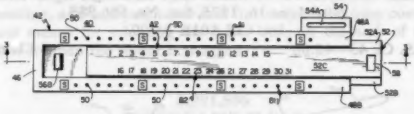


1. In a learning aid including,
an openable box comprising a bottom shell and a cover means for covering said bottom shell; and
a double reel and web assembly in said box including a web and first and second reels for forward winding and reverse winding said web on said reels;
said cover means including a window area for viewing of printed material on said web;
the improvement comprising:
cartridge means in said box for carrying said double reel and web assembly during insertion of said assembly in and removal of said assembly from said box;
said cover means being removable from said bottom shell to permit insertion and removal of said cartridge means and said assembly as a unit.

3,991,499
VARIABLE CALENDAR

Kazumaru, Otuki, 6-6 Honjo, 2-chome, Matumotoshi Naganoken, Japan

Filed May 21, 1975, Ser. No. 579,579
Claims priority, application Japan, May 21, 1974, 49-058539
Int. Cl.² G09D *3/04*
U.S. Cl. 40—109 **4 Claims**



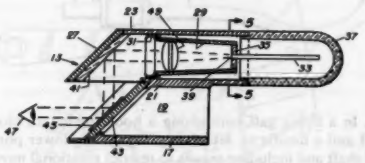
1. A variable calendar device comprising:
a housing member having first and second fixed parallel scales thereon, each said scale having day indicia representing the days of several consecutive weeks at regularly spaced intervals, like days of the week of one scale being in registry with those in the other scale; and
a slide member mounted in said housing between said first and second fixed scales and having first and second movable scales thereon adjacent and parallel, respectively, to said first and second fixed scale, said first and second movable scales being fixed with respect to each other and movable with respect to said first and second fixed scales, and having date indicia thereon representative of calendar dates of a calendar month;
said date indicia being of like spacing as said day indicia;
said date indicia in said first movable scale representing approximately one-half of a maximum length calendar month and said date indicia in said second movable scale representing the remaining days in that month;
said date indicia in said first and second scales being offset such that said date indicia is properly correlated with said day indicia;
said housing member and said slide member are basically rectangular and said slide member is telescopically movable in said housing member;
said housing member includes first and second parallel inturned flanges substantially coterminate with the length dimension of said housing member and bearing, respectively, said first and second fixed scales in respective straight line configurations; and
wherein said slide member includes laterally extending shoulders, slidable beneath said inturned flanges to slidably retain said slide member within said housing member,
said slide member having a surface of substantially the same length as said flanges and bearing said first and second movable scales in coplanar relationship with said fixed scales.

3,991,500
FIREARM SIGHT WITH DIALABLE RANGE CONTROL

Stuart D. Kershner, Bethany, Conn., and David F. Butler, Pompano Beach, Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 22, 1975, Ser. No. 606,824
Int. Cl.² F41G *3/06*
U.S. Cl. 42—1 S **5 Claims**

1. A firearm comprising:
a receiver and a barrel having a bore and a chamber for receiving a cartridge;
means for firing said cartridge;
an optical collimating sight mounted on said firearm including a window for viewing the real image of a distant target, a reticle mounted for vertical movement in said sight, a horizontal fiducial marker and a vertically-extending range-indicating scale, one of said marker and said scale being mounted for concurrent vertical movement with said reticle and the other being fixed on said window, and means for projecting an image of said reticle and said one of said marker and said scale onto said window and superposed on said target image and said other of said marker and said scale;
a range knob mounted on said firearm; and
means connecting said range knob to said reticle for moving said reticle and said one of said marker and said scale vertically relative to said barrel to adjust the angle between the barrel bore and the sight line passing centrally through said image for a selected target range;

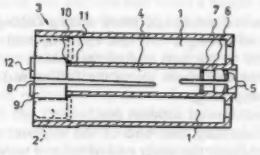


whereby said firearm can be utilized against a visible target by: estimating the range to the target; setting the range knob to the estimated range while observing the position of one of the marker image on said scale and the scale image on said marker, thereby adjusting the sight line for the estimated range; aiming and firing the firearm at the target; visually observing the location of the shot with respect to the target; resetting the range knob to a corrected range; and re-aiming and re-firing the firearm at the target without removing the eye from the target and sight.

3,991,501
LOADING MAGAZINE

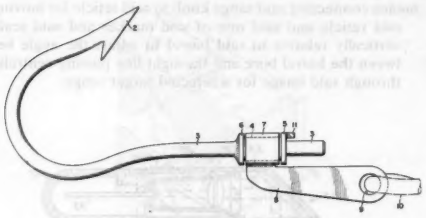
Sven Gunnar Olof Larsson, Huskvarna, Sweden, assignor to Gunnebo Bruks Aktiebolag, Gunnebobruk, Sweden

Filed Jan. 29, 1975, Ser. No. 545,212
Int. Cl.² F42B *39/06*
U.S. Cl. 42—88 **2 Claims**



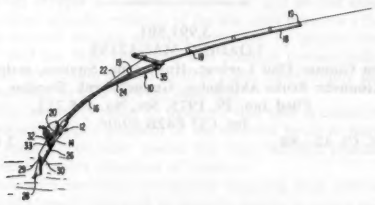
1. A loading magazine in the form of a drum, comprising a plurality of parallel channels with openings provided at an end section of the drum, loadings adapted to be placed in rows in said channels, the openings of the channels being at least partially closed by means of a stop member which is rotatably positioned in the drum, and so positioned that at least a portion of the stop member in itself can be opened for a channel and by rotation movable from one channel opening to another channel opening, but closed when in a rest position; said magazine being rotatably positioned in a device provided with a holder to keep the stop member in a fixed position and when placing the drum into said device to force that portion which is to be opened into its open position.

3,991,502
FLYING GAFF
Vincent J. Tudisco, 19 Linwood Ave., Emerson, N.J. 07636
Continuation-in-part of Ser. No. 571,614, April 25, 1975, abandoned. This application Dec. 3, 1975, Ser. No. 637,280
Int. Cl.[2] A01K *97/14*
U.S. Cl. 43—5 **10 Claims**



1. In a flying gaff comprising a hook having an elongated shaft and a handle to detachably engage the lower portion of said shaft and including means to restrict rotational movement of the shaft relative to the handle, the improvement which comprises: a wing member mounted on said shaft in a manner such that it is freely rotatable around said shaft and including means to restrict axial movement of the wing member relative to the shaft, said wing member having an aperture at its lower extremity adapted to receive a retrieving line.

3,991,503
AUTOMATIC HOOK SETTING FISH ROD HOLDER
Claude L. Lann, Kingfisher, Okla. 73750
Filed Sept. 15, 1975, Ser. No. 613,670
Int. Cl.[2] A01K *97/00*
U.S. Cl. 43—15 **4 Claims**



1. An improved automatic hook setting fishing rod holder for a fishing rod having a butt end and a tip end and carrying a reel mounted to the butt end of the fishing rod and having a line extending therefrom along the fishing rod, said fishing rod holder comprising:

an elongated, bowed support rod,

means for inserting one end of the support rod into the ground to cause the other end of the rod to bow upwardly therefrom with the outboard end extending generally parallel to the ground,

a fishing rod butt end holding member fixedly carried by said support rod near the end penetrating the ground, with the fishing rod extending adjacent thereto,

a latch member fixed to the outboard end of said support rod defining a U-shaped recess facing upwardly for receiving a portion of the rod intermediate of the butt and tip ends, and

a fish setting trigger pivoted to said member to one side of said U-shaped recess and having a first portion extending across the open end of said recess to frictionally lock said rod portion within said recess with said rod bent in conformance with said bowed support rod, and a second portion extending beyond said pivot axis to the other side thereof, and means carried by said second portion and engaging said fishing line such that increase in line tension causes said trigger to pivot about said pivot pin to release the bent intermediate portion of said fishing rod, and to automatically hook a fish on the line causing said increased tension.

3,991,504
FISHING LURE
Curtis A. Pieper, 1016 N. 22nd St., Fort Dodge, Iowa 50501
Filed June 16, 1975, Ser. No. 586,985
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.06 **8 Claims**

1. A fishing lure comprising,

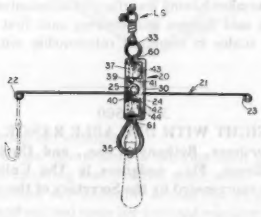
a fishing line having a hook at one end, said hook having a J-shaped shank and barb portion,

an elongated flexible and resilient sleeve on said line with the rear end of said sleeve nesting in the J-shaped shank and barb portion of said hook, the other end of said line extending outwardly of the forward end of said sleeve,

said sleeve having a restricted opening at its rearward end substantially closed by said shank extending therethrough, said sleeve being internally open along its length and at its forward end and adapted to receive emulsified fish bait through said forward opening, said sleeve having openings along its length for dispensing said fish bait during use, and

a bead movably carried on said line and adapted to be positioned in said forward opening and be yieldably frictionally held in said opening by the side wall of said sleeve.

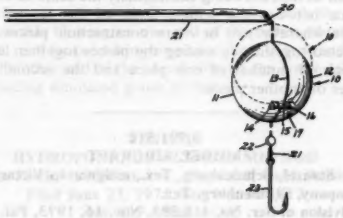
3,991,505
FISHING SPREADER CONNECTOR AND COMBINATION THEREOF
Samuel Simeti, 228 N. Poplar St., North Massapequa, N.Y. 11758
Filed Nov. 3, 1975, Ser. No. 627,494
Int. Cl.[2] A01K *91/00*
U.S. Cl. 43—42.74 **8 Claims**



1. A plastic fishing connector comprising a body portion, loop means for securing a sinker, said loop means having one end thereof integral with said body portion and extending outwardly therefrom and a free end including an upstanding boss at the terminal portion thereof, catch means for latching the free end of said loop means, said catch means having an upstanding side formed integrally with said body portion, a web extending from said integrally formed side across said body portion and another side extending downwardly from said web toward said body portion but short thereof thereby

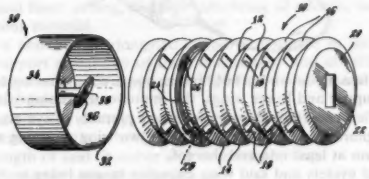
providing entry and exit for said free end of said loop means between said body portion and said other end of said catch means, said catch means presenting inner and outer edges of said web, said loop means being biased so that in the open position said free end extends outwardly of said web and said catch side which is integrally formed with said body portion; the arrangement being such that said catch means constitutes means for receiving said free end of said loop means beneath said web and between said sides with said boss adjacent said inner edge when said loop means is in the closed latched position, and said catch and said free end of said loop constitute means for releasing the latter beneath the web of the former when the sinker is snagged.

3,991,506
FISHING LINE FLOAT
Wayne T. Wise, Box 175, Frankfort, S. Dak. 57440
Filed July 25, 1975, Ser. No. 598,764
Int. Cl.² A01K *93/00*
U.S. Cl. 43—44.88 **6 Claims**



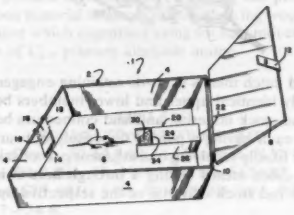
1. An automatically releasable fishing line float, comprising:
a. a lightweight body formed of material providing a substantially smooth and non-deformable surface having at least one convex curved surface portion with a slot therein which is releasably engageable with a fishing line; and
b. means extending across said slot for retaining said float on said line when said line is disengaged from said slot.

3,991,507
COLLAPSIBLE ORGANIZER RECEPTACLE FOR FISHING LEADER
Philip D. Bart, 46 Spinning Wheel Lane, Tamarac, Fla. 33313
Filed Sept. 2, 1975, Ser. No. 609,598
Int. Cl.² A01K *97/00*
U.S. Cl. 43—54.5 R **3 Claims**



1. A leader holder comprising an elongated corrugated shell axially compressible, in a bellows-like manner, along a series of alternately raised and lowered circumferential protrusions and depressions, each said depression being separated from an adjacent protrusion by a continuous circumferential surface, and circumferential surface including therein a plurality of spaced holding means positioned about the length of said circumferential surface, said holding means adapted to hold therein a length of leader, said holding means being located entirely within said circumferential surface, a case, said case dimensioned to encase said shell in its axially compressed state, said case including a first end having a central upstanding member adapted to pass through the inner portion of said holder along its axial direction, and a second end adapted to secure said upstanding member to maintain said shell encased in said axially compressible state.

3,991,508
RAT REMOVING
Charles Petrosky, 1118 N. Jefferson St., Arlington, Va. 22314
Filed Jan. 10, 1975, Ser. No. 540,223
Int. Cl.² A01M *23/08*
U.S. Cl. 43—66 **1 Claim**

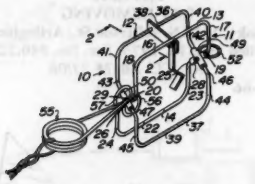


1. Rodent trapping apparatus comprising a container with solid sidewalls, a bottom wall connected to the sidewalls and having a solid top wall hinged at one edge to one of the sidewalls and overlying upper edges of the sidewalls in completion of the container, latch means connected to the top wall and to a sidewall opposite the hinge, sidewall opening and sliding cover means for emptying the contents of the container connected to and mounted on a sidewall of the container, and an elongated solid wall passageway, having a proximal opening connected to a sidewall opening in one of the sidewalls, the passageway extending into an interior of the container and having a distal opening communicating with an interior of the container for providing rodent ingress to the container, first and second opposite long sharp needles connected interiorly to opposite solid sidewalls of the passageway and spaced shortly inward from the container sidewall for prodding rodents toward the distal opening and into the interior of the container, a hinge connected to the passageway at the distal opening and at a top edge of an interior end of a top wall of the passageway and a door connected to the hinge at a top edge of the door, wherein said door has plural holes and has a length at least one and one half times a height of the passageway such that it extends from the top edge of an interior end of the passageway for a long distance into the container and long sharp needles connected to an interior side of the door and pointed into the interior of the container whereby the needles prod rodents away from the door, and wherein the sidewalls of the passageway extend into the interior of the container beyond the point on the top edge of the passageway where the door is connected a distance equal to the length of said door.

3,991,509
SWING-FRAME ANIMAL TRAP
John E. Frost, Rte. 1, Antwerp, N.Y. 13608
Filed Sept. 17, 1975, Ser. No. 614,131
Int. Cl.² A01M *23/26*
U.S. Cl. 43—90 **8 Claims**

1. In an animal trap, a pair of substantially identical open substantially aligned frames each comprising a pair of elongate substantially identical upper and lower members arranged with their ends in respective adjacent relation, and a pair of substantially identical connectors secured between each pair of adjacent ends of said members, a pair of pivots pivotally connecting the connectors of one frame to respective

connectors of the other frame for relative swinging movement of said frames between a set position with one side of each frame adjacent to the other side of the other frame, catch means swingably circumposed about one of said upper members and in releasably retaining engagement with the other of said upper members in said set position, and a trigger extending from said catch means for engagement by an animal to release said catch means from its retaining engagement, said substantially identical upper and lower members being fabricated of rod stock material, and said connectors being cylindrical and each having a pair of oppositely outwardly facing sockets for fixedly receiving one adjacent pair of said member ends, said catch means having a through hole swingably receiving the rod stock material of the respective upper member.

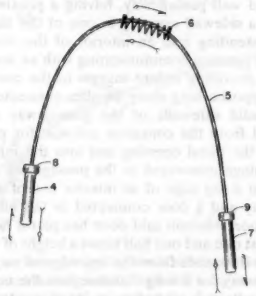


3,991,510

TOY EXERCISING DEVICE

Jay W. Bytheway, 865 Lucy Ave., Salt Lake City, Utah 84104

Filed Aug. 4, 1975, Ser. No. 601,583
Int. Cl.² A63H *33/00*
U.S. Cl. 46—1 R **5 Claims**



1. A toy, comprising:
a flexible rod;
stop means attached to each end of said rod; and
a coil spring having an inside diameter greater than the diameter of said rod and disposed in encircling relation on said rod.

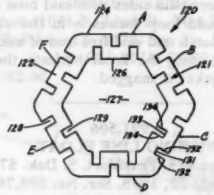
3,991,511

GEOMETRIC CONSTRUCTION PIECE

Jack G. McAllister, 2701 N. Douglas Drive, Minneapolis, Minn. 55422, and Richard O. Bartz, 7017 Mark Terrace Drive, Edina, Minn. 55435

Filed Feb. 26, 1975, Ser. No. 553,084
Int. Cl.² A63H *33/08*
U.S. Cl. 46—25 **21 Claims**

1. A construction piece comprising: a circuitous ring-shaped flexible member having an outer edge, an inner edge, continuous side surfaces, and a plurality of notches in the outer edge and inner edge, each notch being formed by generally parallel side walls and a bottom in a part of the member, said notches including outwardly facing notches in the outer edge, said outwardly facing notches having at least one linearly aligned first pair of notches located in opposite portions of the member, said notches further including inwardly facing notches in the inner edge, said inwardly facing notches having at least one linearly aligned second pair of notches located in opposite portions of the member, each of said first and second pairs of notches having a bottom wall formed by a part of the member, the linear distance between the bottom walls of the first pair of notches being substantially the same as the linear distance between the bottom walls of the second pair of notches whereby two or more construction pieces can be connected together by mating the pieces together using the first pair of notches of one piece and the second pair of notches of another piece.

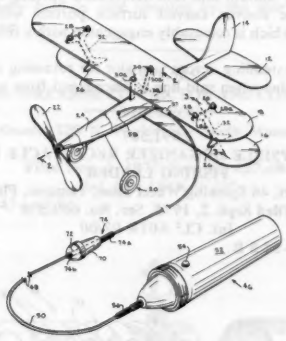


3,991,512

MODEL AIRCRAFT

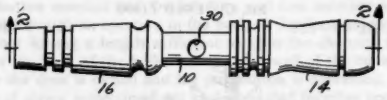
Victor Stanzel, Schulenburg, Tex., assignor to Victor Stanzel Company, Schulenburg, Tex.

Division of Ser. No. 416,593, Nov. 16, 1973, Pat. No. 3,919,805. This application Mar. 31, 1975, Ser. No. 563,673
Int. Cl.² A63H *27/00*
U.S. Cl. 46—76 R **5 Claims**



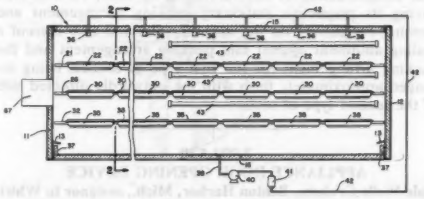
1. In a model aircraft of biplane construction having a body and upper and lower wings, the improvement comprising:
at least one of said wings defining a plurality of eyelets, and
a plurality of struts each having two wing engaging means on at least one end thereof,
said eyelets and said wing engaging means being so spaced and configured that with said struts in a relaxed position, said wing engaging means will not pass through said eyelets, and with said wing engaging means engaged with said wings, said struts will remain partially flexed to exert a retaining force between said wings and said wing engaging means, and
said struts being flexible so as to permit limited movement of said wing engaging means relative to each other whereby said wing engaging means may be selectively inserted through said eyelets and into a position engaging said wings.

3,991,513
COMBINATION GAME CALL
Paul Dudley Faulk, 616 18th St., Lake Charles, La. 70601
Filed July 29, 1975, Ser. No. 600,115
Int. Cl.² A63H *5/00*
U.S. Cl. 46—180 **12 Claims**



8. A combination duck and goose call comprising a central sound chamber defined by a tubular throat element, a channeled trough element mounted in each end of the tubular throat element, a duck call reed mounted in sound-producing relationship to the channel of one throat element, a goose call reed mounted in sound-producing relationship to the channel of the other throat element, a barrel surrounding each said trough element and associated reed, and an aperture in said throat element connecting the said chamber with the atmosphere so that blowing on one end of the barrel vibrates the duck call reed for producing simulated duck sounds and blowing on the other end of the barrel vibrates the goose call reed for producing simulated goose sounds.

3,991,514
HYDROPONIC DEVICE AND METHOD
Darrel S. Finck, 4180 East Ave., Hayward, Calif. 94544
Filed June 27, 1975, Ser. No. 591,113
Int. Cl.² A01G *31/00*
U.S. Cl. 47—1.2 **2 Claims**



1. A device for hydroponic growth of plants from seed which comprises:

A. an elongated chamber having an inlet door and an outlet door for the ends thereof, a floor, a ceiling, and sidewalls; said floor, ceiling, and sidewalls being of smooth, nonporous material,

B. a plurality of elongated supports mounted in pairs to support a plurality of trays horizontally and at different elevations, such supports being held by and spaced from said sidewalls,

C. a plurality of trays positioned horizontally on said supports, said trays being in length at most one seventh the length of said chamber and each tray having

i. a support-engaging perimeter,

ii. a corrugated bottom wherein the upper portion of each corrugation is rounded and the lower portions of adjacent corrugations are spaced too close together to admit said seeds to the bottom of said corrugations,

iii. the lower portion of each corrugation having a plurality of drainage holes therein,

D. a plurality of illumination sources suitable for photosynthesis positioned within said chamber to illuminate the upper surface of said trays between said outlet door and an intermediate position between said outlet door and said inlet door,

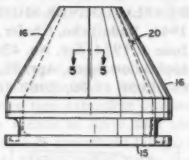
E. ultrasonic nebulizer means for subdividing a liquid positioned to provide subdivided liquid above the uppermost of said trays, and

F. a pump to circulate liquid from the floor of said chamber to said means for subdividing liquid.

3,991,515
PROCESS FOR PRODUCING NAVAL STORES
John Drew, Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.
Filed Mar. 22, 1976, Ser. No. 668,905
Int. Cl.² A01G *23/10*
U.S. Cl. 47—10 **6 Claims**

1. In a process for chemically inducing the production of oleoresinous material in association with living wood cells, the improvement which comprises using for said inducing a dilute dispersion of C_{1-7} primary aliphatic amine.

3,991,516
SEPARATING FLOWER POT
Edward L. Cicero, 52-62 66th St., Maspeth, N.Y. 11378
Filed Dec. 17, 1974, Ser. No. 533,487
Int. Cl.² A01G *9/02, 9/04;* **B65D** *9/02, 9/32*
U.S. Cl. 47—34 R **9 Claims**

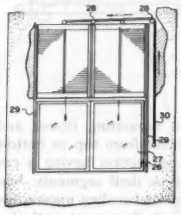


1. An improved separating flower and shrub container increasing in diameter from top to bottom, comprising, the combination: a base section having a cavity; two or more mating upper section shell segments; base section to shell segment circumferential sealing means; two or more individual shell segment to shell segment vertical edge sealing means; and one or more circumferential band means to help secure said shell segments; the upper portion of said base section configured for cooperation with the lower configured portion of said mating upper section shell segments to form a tongue and a groove incorporating said circumferential sealing means, thereby resulting in a leakproof and structural restraining tongue and groove joint; each of said upper section shell segment vertical edges being configured to cooperate with an adjacent configured edge and incorporating said vertical edge sealing means, thereby resulting in a leakproof and structural restraining spline joint; the lower portion of each of said upper section shell segments abutting the upper portion of said base section; said base section being externally reduced in diameter from a point below the tongue and groove joint in the upper portion of the base section, and the reduced diameter terminating and partially forming a circumferential recessed trough at the lower portion of the base section; the recessed trough being located below the bottom of the cavity in the base section; a plurality of passages providing communication between the cavity and the trough; and the internal configuration of said cavity substantially mating with the internal configuration formed by the assembled upper section shell segments to present a smooth continuous faired internal configuration.

3,991,517
SEED COATING
Paul A. Lewis, Salinas, Calif., assignor to Union Carbide Corporation, New York, N.Y.
Filed Feb. 7, 1975, Ser. No. 548,028
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² A01C 1/06
U.S. Cl. 47—57.6 12 Claims

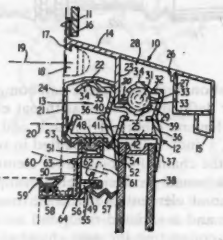
7. A method of coating seeds having irregular surfaces to provide a thin coating enabling them to be processed by seed singulators and seed-tape making machines comprising:
spraying on to said seeds while the seeds are being tumbled a mixture of (1) powdered dry starch ester, and (2) polyvinyl pyrrolidone in sufficient mixture to cause the mixture to stick to the seeds and for the coating to stick to itself and (3) sufficient liquids to enable spraying.

3,991,518
ADJUSTABLE LOUVER SHUTTER
Norisue Ishihara, 1941, Jindaijicho, Chofer,, Japan
Filed June 4, 1974, Ser. No. 476,199
Claims priority, application Japan, Apr. 30, 1974, 49-48440
Int. Cl.² E05F 17/00; E06B 7/096
U.S. Cl. 49—75 2 Claims



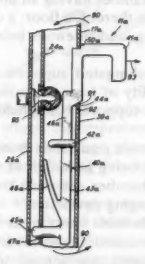
1. An adjustable louver shutter adapted to fit in a door or window opening having a sill along the lower side thereof, means mounting said louver shutter in said door or window opening to permit relative movement of the louver shutter to open and close said opening, said louver shutter comprising top, bottom and side frame members, a supporting frame extending between said top and bottom frames intermediate said side frames, a driving member associated with said supporting frame for independent up and dowm movement relative thereto, a plurality of lower slats arranged between each side frame and the supporting member and journaled therein for pivotal movement about individual axes passing therethrough, a mechanical connection between each said slat and said driving member whereby movement of the latter causes a corresponding pivotal movement to open and close said slats, means for retaining said driving member in a given position relative to said supporting frame, detent means carried by said bottom frame member for movement in and out of locking engagement with said opening sill; and means actuated when said driving member is moved to pivot said slats to open position to engage said detent means with said sill, thereby preventing said louver shutter from being opened while said slats are in open position.

3,991,519
WINDOW CONSTRUCTIONS
Bjørn Bakke, Bergen, Norway, assignor to A. Knag. A/S, Bergen, Norway
Filed Jan. 2, 1975, Ser. No. 537,902
Claims priority, application Norway, Mar. 18, 1974, 740944/74
Int. Cl.² E06B 11/00
U.S. Cl. 49—159 9 Claims



1. In a window construction comprising at least two sections constituted by a window section and a wall section and a common, stationary top profile member having said sections mounted in series thereon of which at least one first type of section is pivotably suspended about an upper horizontal axis for swinging from a closed position to an airing position and a second type of section is stationarily mounted on said member, in which said top profile member is provided with first and second grooves for the first and the second types of section respectively enabling the first type of section to be also longitudinally displaceable relative to the second type of section independently of any remaining sections, each section having its respective stationary packing arrangement and forming exclusively on the inwardly directed side thereof a sealing abutment against said packing arrangement and the packing arrangement for the first type of section being arranged approximately flush with the outwardly directed side of the second type of section.

3,991,520
APPLIANCE DOOR OPENING DEVICE
Dale Wells Graham, Benton Harbor, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.
Filed Dec. 16, 1974, Ser. No. 533,178
Int. Cl.² E05F 11/54
U.S. Cl. 49—276 7 Claims



1. A closure and opening device for appliances having a hollow door hinged to a cabinet front comprising: a latch means selecively maintaining a door in a closed position and releasable to allow the door to open, a door opening device for releasing the latch means, said door opening device comprising a single molded plastic piece having a major portion

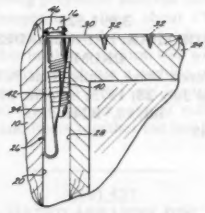
thereof received interiorly of the hollow door, said major portion including an elongated member having a fulcrum point adjacent one end in contact with an interior face of the hollow door and a pushbutton member adjacent the other end of the elongated member, said pushbutton member projecting through an aperture in a front of the door, a ram member projecting from said elongated member intermediate the pushbutton member and the fulcrum, said ram member projecting through an aperture in the back of the door, said ram member having a length sufficient to span the distance between the back of the hollow door and a wall of the cabinet when the door is closed and the pushbutton is depressed, an integral spring projecting from said elongated member opposite the said pushbutton into contact with a back wall of the door biasing the fulcrum agianst the front of the door and the pushbutton into projection from the front of the door, the ram positioned with respect to the pushbutton and the fulcrum to provide a mechanical lever advantage upon depressing the pushbutton to pivot the elongated member about the fulcrum against the spring.

3,991,521

WINDOW SASH HOLDER

Bing Crosby, P.O. Box 14885, Long Beach, Calif. 90814

Filed Feb. 17, 1976, Ser. No. 658,290
Int. Cl.² E05D *13/08*
U.S. Cl. 49—417 **1 Claim**



1. A window sash holder for sashes vertically slidable in a window frame, said holder comprising:

a unitary, generally right angular bracket formed out of sheet material and including an integral horizontal leg adapted to be attached to the horizontal upper portion of the sash adjacent one corner thereof and thereby forming the sole attachment means securing said bracket to the sash, said bracket further including an integral vertical leg adapted to depend between the window frame and the sash for frictional engagement with the window frame, said horizontal and vertical legs including an inner portion formed out of said material and extending downwardly from said horizontal leg, said inner portion having partial threads formed therein, the free extremity of said vertical leg being reversely formed to extend upwardly and thereby define an outer portion located in confronting relation to said inner portion, said outer portion having partial threads formed therein whereby said inner and outer portions define a threaded receptable means; and

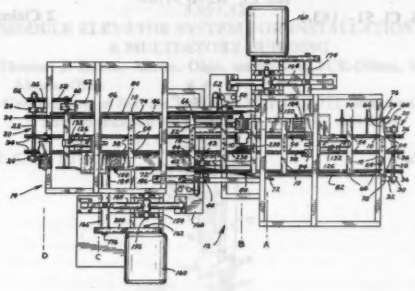
a threaded element disposed within said receptacle means and adapted upon threaded movement downwardly to urge apart said inner and outer portions and thereby bring said outer portion into greater frictional engagement with the window frame.

3,991,522

APPARATUS FOR SHARPENING ROTARY BLADES

Harland R. Hedlund, and Harry K. Wethe, both of St. Paul, Minn., assignors to Aladdin Manufacturing Company, Minneapolis, Minn.

Division of Ser. No. 574,507, May 5, 1975, Pat. No. 3,940,889.
This application Nov. 10, 1975, Ser. No. 630,439
Int. Cl.² B24B *3/36, 21/18*
U.S. Cl. 51—3 **11 Claims**



1. An apparatus for sharpening both ends of elongated, relatively flat, double ended rotary cutting blade work pieces including:

A. a main frame;

B. a horizontal conveyor supported on said main frame and including at least one endless band having sets of parallel work piece drive tabs extending upwardly therefrom;

C. interruptable means to drive said conveyor in a first forward direction to cause said tabs to convey relatively flat, elongated, double ended rotary cutting blade work pieces positioned on said conveyor transversely to said first direction from a first end of said frame toward a second end thereof;

D. a first work piece positioning means mounted on said main frame and operable to contact a work piece on said conveyor, to temporarily fixedly position said work piece with respect to said frame, and then to release it back to said conveyor;

E. a first belt grinder assembly positioned with respect to said frame and including a first moving abrasive grinder belt backed by a first rotating contact wheel;

F. first belt grinder positioning means operable to bring said first moving belt backed by said first rotating wheel into grinding relation to a longitudinally extending forwardly facing leading edge of a first end portion of a work piece which is fixedly positioned by said first work piece positioning means and to retain such grinding relationship only until a first sharpened cutting edge is achieved;

G. a second work piece positioning means mounted on said frame, spaced from said first work piece positioning means and operable to contact a work piece on said conveyor, to temporarily fixedly position said work piece with respect to said frame, and then to release it back to said conveyor;

H. a second belt grinder assembly positioned with respect to said frame and including a second moving abrasive grinder belt backed by a second rotating contact wheel;

I. second belt grinder positioning means operable to bring said second moving belt backed by said second rotating wheel into grinding relation to a longitudinally extending rearwardly facing trailing edge of a second end portion of a work piece which is fixedly positioned by said second work piece positioning means and to retain said grinding relationship only until a second cutting edge is achieved.

3,991,523
VIBRATORY APPARATUS WITH IMPROVED MOTOR ACTUATED DOOR MECHANISM FOR CLOSING THE DISCHARGE OUTLET

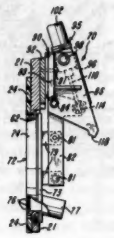
Max Isaacson, Dayton, Ohio, assignor to Vibrodyne, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 450,975, March 14, 1974, Pat. No. 3,871,136. This application Feb. 4, 1975, Ser. No. 547,047

The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.

Int. Cl.² B24B *31/06*

U.S. Cl. 51—163.1 **2 Claims**



1. In vibratory apparatus including a frame, a vibratory container defining a chamber adapted to receive a load of media and parts to be vibrated, means mounted on said frame and supporting said container for vibration, power operated means for vibrating said container with sufficient force to effect movement of the load within said chamber, said container having a wall defining an outlet to provide for the discharge of treated parts from said chamber, a door member, means supporting said door member for pivotal movement between a closed position forming a closure for said outlet and an open position spaced from said outlet, an improved system for actuating said door member, comprising a reversible electric motor including a permanently magnetized stator, a rotary drive mechanism driven by said motor and connected to move said door member between said open and closed positions in response to operation of said motor, means mounted on said vibratory container and supporting said motor and said drive mechanism for pivotal movement as a unit on an axis spaced parallel and above the pivot axis of said door member, means forming a stop surface for engaging said door member in said open position, and said motor and said drive mechanism cooperate to hold said door member against said container wall in said closed position and against said stop surface in said open position in response to actuation of said motor.

3,991,524
VIBRATORY FINISHING EQUIPMENT

Achille K. Ferrara, Addison, Ill., assignor to Ultramatic Equipment Company, Addison, Ill.

Continuation of Ser. No. 457,972, April 4, 1974, abandoned. This application July 10, 1975, Ser. No. 594,726

Int. Cl.² B24B *31/06*

U.S. Cl. 51—163.1 **12 Claims**

1. Vibratory finishing equipment for finishing pieceparts,

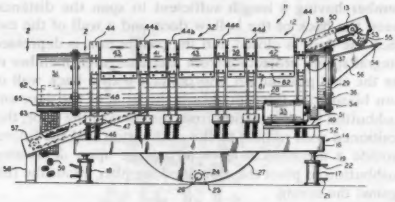
said vibratory finishing equipment comprising a cylindrical container having its longitudinal axis in a horizontal plane,

said container having circular walls, an input end and a discharge end,

axial motion inducing means for inducing axial motion of the contents from the input end to the discharge end when the container is vibrated,

vibration inducing means for causinng the container to vibrate,

said vibration inducing means mounted on said circular walls at only either one of the upper quadrants of said cylindrical container where the upper quadrants are above the horizontal plane, no part of said vibration inducing means being located on or below the horizontal plane, and



said vibration inducing means agitating the container to cause the pieceparts and media to be actuated to the maximum rotatable motion in the vicinity of the vibration inducing means and to the minimum rotatable motion on the side of the container directly opposite said vibration inducing means whereby a maximum circular motion is obtained in the vicinity of the vibration inducing means and a minimum circular motion is obtained at the bottom of said container opposite the vibration inducing means.

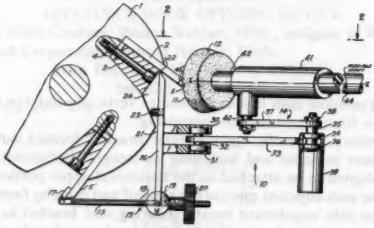
3,991,525
APPARATUS FOR SHARPENING BLADES MOUNTED ON DRUMS

Fred Oswald, Forest Drive, Sands Point, N.Y. 11050

Filed July 28, 1975, Ser. No. 599,824

Int. Cl.² B24B *3/55*

U.S. Cl. 51—249 **19 Claims**



1. Apparatus for sharpening a blade mounted on a support, the blade having an operative cutting surface, said apparatus comprising mounting means for attachment to said support, a rotatable sharpening member having a sharpening surface with at least one edge lying in a plane and adapted for sharpening the cutting surface of the blade, and connection means coupled to the mounting means and supporting the sharpening member for movement in a plane perpendicualr to the plane of the edge of the sharpening surface and disposed such that the sharpening surface can be brought into contact with the cutting surface of the blade and be advanced therealong, said connection means being a linkage means for moving said sharpening member in said plane about a pivot axis perpendicular to said plane of movement.

3,991,526

SYNTHETIC FIBROUS BUFF

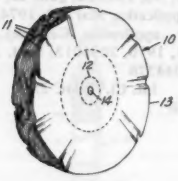
Burton E. Frank, Shoreview; Lloyd W. Legacy, White Bear Lake, and Dean S. Walker, Grant Township, Washington County, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 12, 1975, Ser. No. 576,859

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² B24D *17/00, 11/00;* **A47L** *25/00;* **B24D** *13/04*

U.S. Cl. 51—358 **15 Claims**



1. A rotary buff comprised of a plurality of layers of nonwoven fabric held together by fastening means, said nonwoven fabric having a fabric density on the order of 0.1 to 0.6 grams per cc, being at least about 0.1 mm thick and consisting essentially of a multiplicity of randomly disposed, adhesively bonded, flexible, durable, tough, resilient organic fibers no larger in size than about 8 denier, having a length on the order of 1 cm to 15 cm and a break strength of at least about 3.5 grams per denier, said fibers being formed of a synthetic organic fiber-forming polymeric material having a melting or decomposition temperature above about 175°C, said fibers being firmly adhesively bonded at points where they cross and contact one another to form a uniform web with a rigid but not brittle binder material which has a melting or decomposition temperature above about 175°C, said binder material being contained in said fabric in an amount sufficient to firmly adherently bind said fibers together but insufficient to immobilize said fibers.

3,991,527

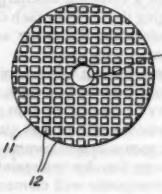
COATED ABRASIVE DISC

Armand C. Maran, Deerfield, Ill., assignor to Bates Abrasive Products, Inc., Chicago, Ill.

Filed July 10, 1975, Ser. No. 594,626

Int. Cl.² B24D *13/14*

U.S. Cl. 51—397 **3 Claims**



1. An abrasive coated disc comprising:

a. a fibrous disc-shaped base sheet or substrate having a peripheral edge and including a surface having thereon

b. a geometrically arranged pattern of spaced adhesively coated areas;

c. a coating of finely divided abrasive material over each of the said adhesively coated areas;

d. uncoated scavenging channels between the said adhesively coated and abrasive coated areas extending across the said fibrous disc-shaped base sheet or substrate between the said adhesively coated and abrasive coated areas and opening outwardly onto the said peripheral edge of the said abrasive coated disc for the discharge of the scarfings formed by the said abrasive coated disc during engagement thereof with a metal or like surface in use; and

e. the said scavenging channels being in the form of embossed channels formed in the said fibrous disc-shaped base sheet or substrate.

3,991,528

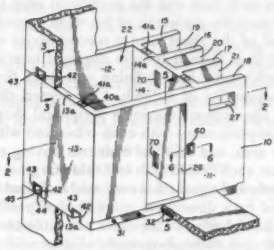
MODULE ELEVATOR SYSTEM FOR INSTALLATION IN A MULTI-STORY BUILDING

Thomas J. Dillon, Akron, Ohio, assignor to FCE-Dillon, Inc., Akron, Ohio

Continuation of Ser. No. 142,644, May 12, 1971, abandoned. This application Apr. 13, 1973, Ser. No. 351,016

Int. Cl.² E04H *1/00, 1/04*

U.S. Cl. 52—79 **2 Claims**



1. A modular elevator system for installation in a multi-story building by means of suitable lifting apparatus, comprising;

a. a series of identical elevator modules each of which

1. is of precast concrete construction that includes internally embedded reinforcing rods,

2. includes front, back, and opposed side walls and upper and lower surfaces that form a vertical elevator shaft of at least one-story height,

3. has at least one door opening provided in the front wall portion thereof,

4. has a plurality of metal support channels embedded within and forming a part of the inside wall surfaces of said modules for rail and door supporting purposes,

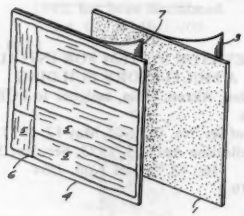
5. has upper and lower vertically aligned leveling and attachment means provided on each top and bottom surface of at least two of said opposed walls; the leveling means on said top surface including first metal angle members embedded therein; the leveling means on said bottom surfaces including recesses having second metal angle members secured therein and; third metal angle members for interconnecting said first and second angle members following leveling and alignment of said modules by the lifting apparatus;

6. has means for rigidly securing said adjusted, vertically adjacent modules to each other and to adjacent floor surfaces of each floor of said building, whereby an elevator shaft consisting of vertically adjacent modules is integrally secured to said building throughout its height.

3,991,529
TILE ASSEMBLY

Bruce J. Terwilliger, Newburgh, N.Y., assignor to GAF Corporation, New York, N.Y.

Continuation of Ser. No. 361,033, May 17, 1973, abandoned. This application Nov. 21, 1974, Ser. No. 525,943
Int. Cl.² E04C 2/20
U.S. Cl. 52—100 5 Claims

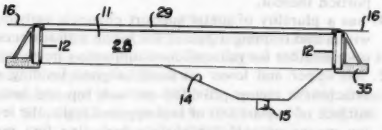


1. A tile assembly comprising a sheet of breakable vinyl plastic material having a first series of interconnected score lines formed therein defining a protective marginal border area between such lines and the peripheral edge of the sheet extending around the perimeter of the sheet extending around the perimeter of the sheet, and a second series of interconnected score lines formed therein disposed interiorly of said marginal border area and defining with said first series of score lines a plurality of individual connected tile elements, each of said tile elements having a peripheral shape and configuration complimentary with each other and with said marginal border area, and said tile elements having a decorative upper surface; each of said tiles and said marginal border area having uniform and equal thickness; said marginal border area being defined by a dimension extending perpendicularly between a peripheral edge of the sheet and a tile element which is substantially less than substantially all dimensions of said tile elements; said first and second series of score lines further defining lines of weakness to permit breakage of the sheet by hand pressure along said score lines and the separation of the protective marginal border area and each individual tile therefrom.

3,991,530
SWIMMING POOL CONSTRUCTION

Chris N. Scourtes, 28875 Joy Road, Westland, Mich. 48185

Filed Aug. 15, 1975, Ser. No. 604,887
Int. Cl.² E04H 12/20
U.S. Cl. 52—146 3 Claims



1. In a swimming pool construction including a plurality of upright walls, each wall including horizontal upper and lower strips interconnected by spaced apart vertical strips to form a frame and relatively stiff sheet material secured to one side of each frame, and a number of spaced apart bracings for each upright wall, each bracing including a horizontal leg, a vertical leg and an angular leg, said legs being interconnected in a triangular configuration, each bracing secured to the other side of a frame, the improvement comprising:

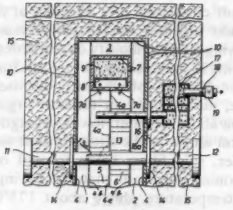
a concrete foundation on said other side of said frame, said concrete foundation having an upper surface, said upper surface having upper and lower levels, said lower level extending under and supporting said lower wall frame strip; and

said horizontal brace leg being completely embedded in and supported by said concrete foundation.

3,991,531
COMPOSITE WALL ELEMENT FOR THERMAL AND ACOUSTIC INSULATION

Otto Alfred Becker, Robert-Koch-Strasse 59, 66 Saarbruecken 6, Germany

Division of Ser. No. 156,852, June 25, 1971, Pat. No. 3,808,784. This application Mar. 22, 1974, Ser. No. 453,781
Claims priority, application Germany, June 25, 1970, 2031394; June 21, 1970, 2036013; Sept. 2, 1970, 2043461; Sept. 18, 1970, 2044378
Int. Cl.² E04C 2/00
U.S. Cl. 52—173 R 2 Claims



1. Wall structure for thermal and acoustic insulation of walls, ceilings and floors of buildings and other structures, comprising

a. a plurality of adjacently disposed individual composite wall elements which form said wall structure, each of said composite wall elements including an outer wall element which is pressure resistant and an inner insulating wall element mounted within said outer wall element,

b. first pipe means communicating with each composite element and with a first common feed line for admitting air simultaneously to each composite element,

c. second pipe means communicating with each composite element and with a common discharge line for simultaneously discharging the air from each composite element,

d. air pumping means for delivering ambient air to said common feed line,

e. an air filter communicating with said air pumping means,

f. an air drying device in communication with said air pumping means for drying the air and thus providing a dry gas atmosphere in said composite wall elements,

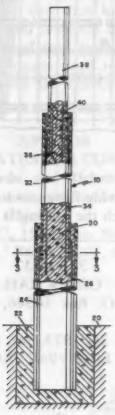
g. adjustable valve means in said common feed line and said common discharge line for maintaining the desired air pressure in the composite wall elements and the replacement of the air therein, and

h. a volume equalization device which comprises a casing with inlet and outlet pipes communicating with said air filter and an equalization part movably mounted in said casing depending on the changes in temperature and atmospheric pressure, a first contact switch provided in said casing for actuating said air pumping means on contact with the moving equalization part, and a second contact switch provided to stop said air pumping means on contact with said equalization part when the latter is moving in the opposite direction.

3,991,532
SIGN POST CONSTRUCTION

Seymour Buxbom, Riverside, Calif., assignor to Desert Outdoor Advertising, Inc., Riverside, Calif.

Continuation of Ser. No. 357,945, May 7, 1973, abandoned, which is a continuation of Ser. No. 178,034, Sept. 7, 1971, abandoned. This application Apr. 12, 1974, Ser. No. 460,544
Int. Cl.² E02D *27/42*; E04C *3/34*; E04G *21/00*
U.S. Cl. 52—297 3 Claims



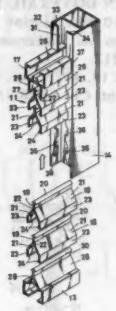
3. A sign post construction comprising,
a length of fiberglass type pipe set vertically in a foundation in the ground and having steel reinforcing positioned therein and said pipe being filled with concrete,
a second length of fiberglass type pipe having a smaller diameter than said first length of pipe and having its lower end positioned in the upper end of said first length of pipe and in said concrete,
said second length of pipe having reinforcing positioned therein and being filled with concrete,
means secured to the upper end of said second length of pipe for supporting a sign,
said steel reinforcing comprising steel rods arranged in a rebar cage and being vertically disposed in said first and second lengths of pipe,
and said rebar cage of said first length of pipe extending above the lower edge of said second length of pipe and said rebar cage of said second length of pipe extending below the lower edge of said second length of pipe.

3,991,533
LOUVER ASSEMBLY

Mitsuo Nagase, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,409
Claims priority, application Japan, Aug. 13, 1974, 49-96788
Int. Cl.² E06B *7/08*
U.S. Cl. 52—473 6 Claims

1. A combination louver and window assembly, comprising:
a. a pair of vertical stiles having vertically extending slots facing each other;
b. three parallel rails, one joining the upper ends of said stiles, one joining intermediate points on said stiles, and one joining the lower ends of said stiles;
c. a panel encircled by and received within a portion of said vertical stiles, within the intermediate one of said rails and one of the other of said rails;
d. said stiles, remotely from said panel, having opposed pairs of vertically aligned recesses in the marginal edges defining said slots, said pairs being vertically spaced, said recesses being symmetrical in shape relative to the vertical slots; and
e. a plurality of horizontal louver boards held at opposite ends in opposed pairs of said recesses in said vertical

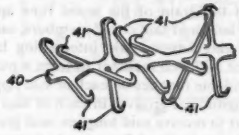


stiles, and disposed between said intermediate rail and the other of said rails, said louver boards having a cross-section of inverted Y-shaped configuration having two downwardly extending legs fitting into a pair of said opposed symmetrical recesses, and an upwardly extending leg extending between the downwardly extending legs of an adjacent louver board in spaced relation thereto.

3,991,534
CLADDING ELEMENTS

George C. Brumlik, Montclair, N.J., assignor to Ingrip Fasteners Inc., New York, N.Y.

Continuation of Ser. No. 126,707, March 22, 1971, abandoned. This application Aug. 8, 1973, Ser. No. 386,679
Int. Cl.² E04B *5/52*; A44G *17/00*; A43B *23/20*
U.S. Cl. 52—483 1 Claim



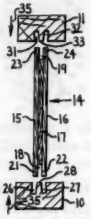
1. Composite laminate comprising a structural element and a cladding element each having attached thereto a receiving layer adapted to permit gripping elements to penetrate and lodge therein, the receiving layers of said structural element and said cladding element being in face-to-face relationship, said cladding element being fastened to said structural element by a gripping connection formed between said respective facing receiving layers by a gripping member having a central linear strip member having a pair of substantially flat opposite faces generally parallel to each other, and a multiplicity of stiff gripping elements extending laterally from both opposite edges of said member, each said gripping element including a generally straight portion with a generally U-shaped portion at its end forming a hook, some of said straight portions extending out of the planes of said faces in a variety of directions and forming an irregular pattern, said gripping members extending towards the respective receiving layers of said structural and cladding elements, said gripping elements being firmly embedded and lodged in both the respective receiving layers of said structural element and said cladding element thereby forming said composite laminate with a multiplicity of gripping connections between the respective facing

receiving layers of said structural element and said cladding element.

3,991,535
PRESSED-IN DOVETAIL TYPE JOINT

James R. Keller, 1410 NE. Marine Drive, Portland, Oreg. 97211, and William A. Nickerson, 2615 NE. 36th St., Portland, Oreg. 97212

Filed Mar. 14, 1975, Ser. No. 558,350
Int. Cl.² E04B *1/32*
U.S. Cl. 52—642 **7 Claims**



1. A structural load bearing member comprising a pair of elongated chord members of wood material and a plywood web member interconnecting said chord members by means of glued tongue and groove joints, said plywood web member having at least two layers of veneer in which the grain of the wood runs approximately perpendicular to the length of said chord members and having at least one intervening layer of veneer in which the grain of the wood runs approximately parallel with the length of said chord members, said two layers of veneer projecting beyond said intervening layer on two opposite edges of said web member to form a pair of parallel spaced apart bendable tongues on each of said opposite edges, and a pair of longitudinal grooves in each of said chord members spaced apart to receive said tongues, said grooves in each chord member being inclined from top to bottom relative to each other to bend said tongues out of parallelism with each other and form a self-locking dovetail type joint when said chord members are pressed onto said web member, said joints holding said members together in assembled relation without external clamps while said glue is setting.

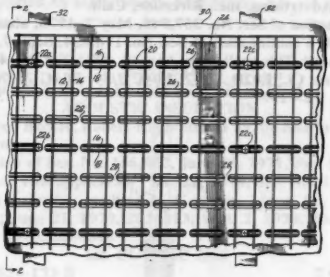
3,991,536
LATHING

Barry A. Rutherford, 10008 Forbes Ave., Sepulveda, Calif. 91343

Filed Mar. 31, 1975, Ser. No. 563,383
Int. Cl.² E04C *2/42*
U.S. Cl. 52—661 **17 Claims**

1. In a lathing material comprising a plurality of spaced apart intersecting vertical and horizontal strands secured together at the points of intersection such that the strands define a grid in which the spaces between strands are larger than the head diameter of conventional fasteners, the improvement comprising:

an additional strand closely spaced adjacent and arranged in parallelism with each of a certian of the strands such that the pairs of closely spaced strands define a plurality of slots located at spaced intervals across the lathing

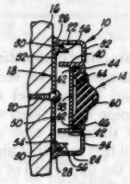


material for receiving fasteners to be driven into framing members on which the lathing is mounted.

3,991,537
CHAIR RAIL

Russell L. Brown, P.O. Box 14546, Oklahoma City, Okla. 73114

Filed Aug. 20, 1973, Ser. No. 389,942
Int. Cl.² E04F *19/02*; A47B *95/00*
U.S. Cl. 52—717 **4 Claims**



1. A chair rail comprising:

an elongated, rigid base plate of generally U-shaped cross-section adapted to be secured to a supporting surface and including:

a web portion;

a pair of substantially parallel legs projecting at right angles from the opposite sides of said web portion; and

locking barbs carried on said legs;

an elongated, rigid rail member of generally U-shaped cross-section, said rigid rail member including:

a pair of parallel legs constituting opposite sides of said rigid rail member and projecting toward said base plate in a direction substantially normal to the web portion thereof;

spaced, substantially coplanar elongated faces each connected at one side edge to one of said second-mentioned parallel legs of said rail member and extending substantially normal thereof; and

an elongated rigid structure of I-shaped cross-section positioned between and interconnecting said substantially coplanar faces, and defining an elongated channel extending the length of said rail member, said rigid structure of I-shaped cross-section including:

a transverse plate extending parallel to the web portion of said base plate; and

a pair of parallel side plates secured to the opposite side edges of the transverse plate and extending substantially normal to the plane of the transverse plate in planes projecting normal to the web portion of the base plate, said side plates projecting into close proximity to said base plate but being spaced therefrom to permit yielding of the rigid structure of I-shaped cross-section in a direc-

tion toward the base plate until said side plates contact the web portion of said base plate;

an elongated, elastomeric bumper strip slidably positioned in said channel and extending from one end of said rigid rail member to the other; and

terminal caps secured to said base plate at the opposite ends thereof and retaining said bumper strip against sliding movement in said channel, said terminal caps each including a portion lying between said elongated elastomeric bumper strip and the web portion of said generally U-shaped base plate and thus hidden from view, said portion of each of said terminal caps being the point of securement of each of said terminal caps to said base plate whereby the means used to secure said terminal caps to said base plate are hidden from view.

3,991,538

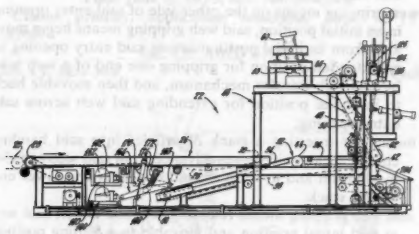
PACKAGING APPARATUS FOR COMPRESSIBLE STRIPS

Lawrence R. Finn, Toledo, and Richard C. Yawberg, Grand Rapids, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jan. 27, 1975, Ser. No. 544,426

Int. Cl.² B65B *63/02, 63/04*

U.S. Cl. 53—21 FW **25 Claims**



1. A method of packaging a fibrous strip into a roll, said method comprising feeding the strip longitudinally along a path, positioning a surface with a portion extending into the path, moving the surface transversely of the path to cause the forward edge of the strip to be moved transversely away from the path, positioning a roll near the surface on the side from which the strip is fed, engaging the forward edge of the strip with the roll, rotating the roll with a portion nearest the surface moving in a direction opposite to the surface to move the forward edge of the strip back toward the feeding path, applying compressive forces to the outer wrap of the strip as it is being rolled, and increasing the compressive forces as the size of the rolled strip increases.

3,991,539

METHOD AND APPARATUS IMPROVEMENTS IN CASE PACKING LIGHTWEIGHT FRAGILE ARTICLES

James J. Luca, Meriden, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 7, 1975, Ser. No. 629,799

Int. Cl.² B65B *35/30, 35/54*

U.S. Cl. 53—26 **10 Claims**

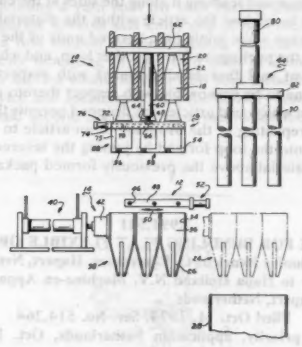
1. In a process for case packing bottles which comprises:

cyclically releasing lower layers of fragile, lightweight bottles accumulated in substantially vertical stacks to a plurality of pockets below; and

simultaneously ejecting the bottles from the pockets to a case;

the improvement in said process wherein bottle impact damage is substantailly prevented during release to the pockets, comprising, in combination, the steps of:

a. gently lowering said stacks at a controlled rate; and



b. isolating each lower layer from the stacks after lowering and prior to each cyclical release.

3,991,540

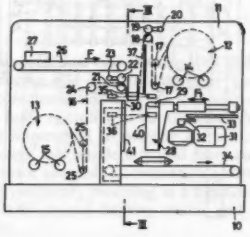
PACKAGING MACHINE

Aris Ballestrazzi; Lamberto Tassi, and Gianni Tosarelli, all of Vignola, Modena, Italy, assignors to Situmo Holding S.A., Luxemburg

Continuation of Ser. No. 149,630, June 3, 1971, abandoned. This application Sept. 26, 1975, Ser. No. 617,170

Int. Cl.² B65B *57/06*

U.S. Cl. 53—59 R **4 Claims**



1. A machine for packaging articles in heat sealable and severable sheet material comprising:

means for rotatably supporting two rolls of the sheet material,

driven means for feeding the material from both said rollers to lower a depending loop of the material formed by joined ends of the material from both said rolls,

means for successively dropping articles to be packaged into the loop to be supported thereby,

first sensing means responsive to the presence of an article supported in the loop for automatically stopping said dropping means and actuating said driven means to lower the loop and the article, said first sensing means being fixedly secured to said machine and being immovable with respect thereto along the path in which said articles are dropped,

second sensing means responsive to the lowering of the loop a distance greater, by a predetermined amount, than the height of the article for stopping the driven means and the lowering of the loop, and

heat sealing and severing means actuated by said second sensing means and adapted for transverse engagement with the material above the article and longitudinal en-

gagement with the material along the sides thereof at the ends of the article for simultaneously transversely severing the material while seaming it above and below the severance and seaming it along the sides at the ends of the article to enclose the article within the material to form a package while joining the severed ends of the material above the package to form another loop, and wherein the fixing of said first sensing means with respect to said machine to be immovable with respect thereto along the path in which said articles are dropped permits the immediate repeating of the dropping of an article to be packaged into the loop formed by joining the severed ends of the material above the previously formed package.

3,991,541

DEVICE FOR BUNDLING FLAT FLEXIBLE OBJECTS

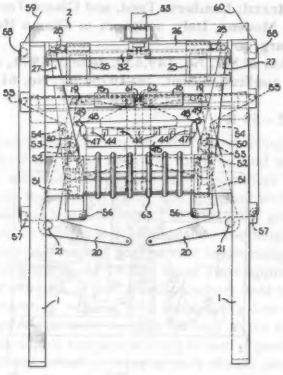
Petrus Antonius Henricus C. Eijsermans, Hapert, Netherlands, assignor to Hapa Holland N.V. Machine-en Apparatenfabriek, Hapert, Netherlands

Filed Oct. 11, 1974, Ser. No. 514,264

Claims priority, application Netherlands, Oct. 15, 1973, 7314126

Int. Cl.² B65B *13/20, 63/02*

U.S. Cl. 53—124 A **23 Claims**



1. A bundling machine for flat flexible objects which comprises:

a frame;

a pair of horizontally slideable portions within said frame defining the bottom of a storage space;

tape guiding means for guiding a pair of tapes across the bottom of said storage space, the ends of said tapes being adhered one to the other;

means for delivering a plurality of said objects to said storage space forming a pile of objects;

means for causing said slideable portions to move apart allowing said pile of objects to move downward and including means for moving said slideable portions together again over said pile of objects causing said tapes to form a loop around said pile of objects;

adhering and severing means for severing said loop from said tapes, adhering the ends of said loop, whereby said pile of objects is bundled, and adhering the ends of said severed tapes; and

clamping means for clamping said pile of objects against the bottom of said slideable portions before the ends of said loop are adhered.

3,991,542

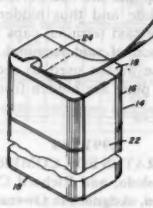
APPARATUS FOR BANDING A STACK OF ARTICLES

Neil S. White, and George R. Schindler, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 17, 1974, Ser. No. 506,925

Int. Cl.² B65B *13/20, 13/32*

U.S. Cl. 53—198 R **12 Claims**



1. In an apparatus for banding a stack of articles to form a bundle, the combination comprising:

a banding chute having an entry opening;

means including a web transfer mechanism on one side of said entry opening;

web gripping means on the other side of said entry opening in an initial position, said web gripping means being movable from its initial position across said entry opening to an extended position for gripping one end of a web held by said web transfer mechanism, and then movable back to its initial position for extending said web across said entry opening;

means for inserting a stack of articles into said banding chute causing said web to advance from said web transfer mechanism and to wrap around two sides and lower end of said stack;

said web gripping means releasing said one end of said web at said initial position and movable to a folding position for folding said one end across an upper end of said stack;

sealing means on said one side of said entry opening separate from said web gripping means for engaging a continuous portion of said web between said web transfer mechanism and said banding chute, folding said web portion over and into engagement with said one end of said web and sealing said web portion to said one end to form a bundle of articles; and

means for severing said sealed web portion from said web transfer mechanism.

3,991,543

SEALING UNIT FOR AUTOCLAVE STERILIZATION OF FLEXIBLE PACKAGES

Fred B. Shaw, Hinsdale, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

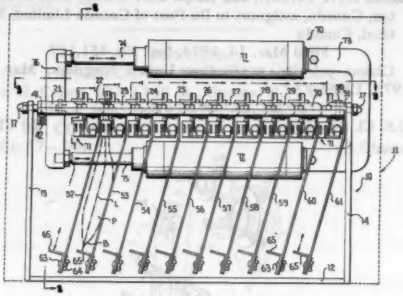
Filed Apr. 21, 1975, Ser. No. 569,938

Int. Cl.² B65B *51/14, 55/02*

U.S. Cl. 53—373 **12 Claims**

1. A sealing unit for an autoclave comprising means for supporting a plurality of open mouth containers in an upright condition, means for applying closing pressure to the open mouth of each container, said pressure applying means including a plurality of cooperative pairs of opposing pressure bars, means mounting said pressure bars for relative movement between a first position at which each cooperative pair of pressure bars are sufficiently spaced from each other to permit the open mouth of a container to be positioned therebetween and a second position at which each cooperative pair of pressure bars are closer to each other than at said first position whereby the open mouth of each container is closed by the pressure exerted thereon by the associated pair of pressure

bars, means for relatively moving said pressure bars between the first and second positions thereof, and said mounting



means mount said pairs of pressure bars for sliding movement relative to each other.

3,991,544

CROP GATHERING MACHINE

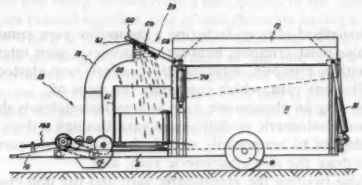
John Allwood, North Parramatta, Australia, assignor to Grasslands Pty. Limited, Villawood, Australia

Filed June 5, 1975, Ser. No. 584,370

Claims priority, application Australia, June 7, 1974, 7820/74

Int. Cl.² A01D *87/12*

U.S. Cl. 56—344 **7 Claims**



1. A crop gathering machine comprising means for collecting and discharging previously cut crop, said means having a discharge outlet for the discharge of the collected crop; a container coupled to said means for holding the collected crop in a stack, said container having an opening therein through which crop discharged from said discharge outlet can pass onto said stack; pressure charging means adjacent said container and operable for continuously receiving discharged crop and forcing the same into said container; and discharge guide control means operatively associated with said collecting and discharging means and with said container and pressure charging means for selectively directing crop discharged from said discharge outlet into said opening of the container and into said pressure charging means in selected proportions.

3,991,545

PNEUMATIC AUXILIARY DEVICE

Helmut Ritter, and Max Schnetzer, both of Wattwil, Switzerland, assignors to Heberlein Maschinenfabrik, Wattwil, Switzerland

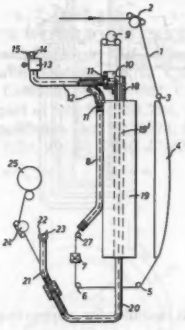
Filed Dec. 22, 1975, Ser. No. 643,037

Claims priority, application Switzerland, Jan. 17, 1975, 571/75

Int. Cl.² D01H *13/04, 13/28*

U.S. Cl. 57—34 HS **5 Claims**

1. A pneumatic auxiliary apparatus for introducing a running yarn into a false-twist texturing machine having a false-twist device in association with a first heating device, the machine also having a second heating device formed for the passage of yarn therethrough from an entry end thereof, a wind-up device for yarn after its passage through said second heating device, and suction means; said apparatus comprising means defining a yarn path for yarn passing from said false-twist imparter towards said entry end of said second heating device, a first suction device including a suction nozzle for temporarily mounting in said yarn path in communication with said suction means to draw said yarn through said false-twist device and locate said yarn for delivery into said entry end of said second heating device, means for receiving said



yarn when so located and co-operating with said suction nozzle for introducing said yarn to said entry end, means for interrupting communication between said suction means and said nozzle, a knife operative to cut the yarn when said communication is interrupted to provide a free length of yarn extending through said nozzle into said entry end, and a second suction device adapted to communicate with said suction means and for temporary mounting in a location to draw said yarn through said second heating means and towards said wind-up device.

3,991,546

DOUBLE-TWIST APPARATUS

Siegfried Scherf, and Aloys Greive, both of Munster, Germany, assignors to Hamel GmbH Zwirnmaschinen, Munster, Germany

Filed Nov. 7, 1975, Ser. No. 630,074

Claims priority, application Germany, July 11, 1974, 2452939; Sept. 15, 1975, 291644[U]

Int. Cl.² D01H *7/22, 7/12, 13/16*

U.S. Cl. 57—80 **20 Claims**

1. A filment-spinning apparatus comprising:

a support having a cylindrical bore defining a main axis,

a sleeve rotatable in said bore about said main axis and having an eccentric bore centered on an eccentric axis parallel to and offset from said main axis,

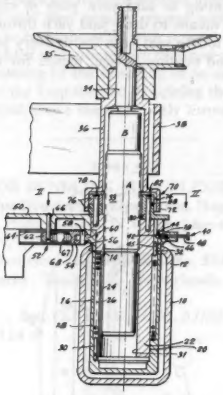
a spindle rotatable in said eccentric bore about said eccentric axis,

a belt continuously displaceable past said support,

a whorl on said spindle adjacent said belt,

means for displacing said sleeve angularly about said main axis between an operating position with said whorl engaging and driven by said belt and a rest position with said

whorl spaced from and out of engagement with said belt, and



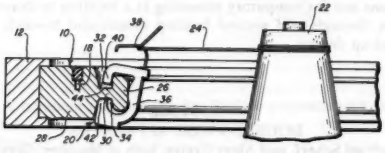
means on said spindle for supporting a yarn package thereon.

3,991,547

EASY PIECE-UP SPINNING RING

Andrew John Wayson, Needham, Mass., assignor to Litton Industrial Products, Inc., Hingham, Mass.

Filed Feb. 9, 1976, Ser. No. 656,365
Int. Cl.² D01H 7/64
U.S. Cl. 57—119 **9 Claims**



1. A porous metal spinning ring for spinning textile fibers adapted to be used in cooperation with a ring holder having a lubricant supply means and a traveler having a textile-engaging loop extending above a generally C-shaped, ring-engaging body, said ring comprising:

an annular ring body adapted to cooperate with said ring holder, said ring body having an annular channel formed therein and adapted to cooperate with said lubricant supply means for dispensing lubricant around the ring,

an annular flange extending inwardly from the body of the ring, said flange adapted to support said traveler body, and

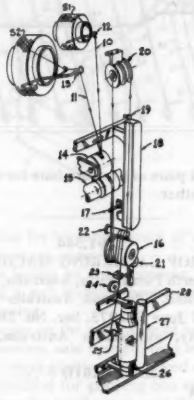
means on said ring associated with said traveler for preventing textile fibers from becoming hooked under said traveler body when textile fibers are hooked under said traveler loop in preparation for spinning.

3,991,548

COMPOSITE YARNS

Zoltan Steve Toronyi, and Ralph Carl Wirsig, both of Kingston, Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Filed Mar. 14, 1974, Ser. No. 451,117
Claims priority, application United Kingdom, Mar. 16, 1973, 12856/73
Int. Cl.² D02G 1/02, 3/32
U.S. Cl. 57—140 BY **10 Claims**



1. A method of manufacturing a composite yarn consisting of a false-twist crimped, heat-set, elastomeric yarn intermingled with a crimped, substantially heat-set, non-elastomeric multifilament yarn, which comprises the steps of:

a. feeding an elastomeric yarn and an incompletely drawn, non-elastomeric multifilament yarn through a draw zone adapted to temporarily stretch the elastomeric yarn and to draw the non-elastomeric yarn, and

b. false-twisting the elastomeric yarn and the non-elastomeric yarn together while heat-setting twist in the combined yarns at a temperature below that at which the elasticity of the elastomeric yarn would be substantially destroyed, followed by untwisting the heat-set twist to form a crimped composite yarn.

3,991,549

FILAMENT YARN AND PROCESS TO PREPARE SAME

Karl Heinrich, Bobingen, and Norbert Heichlinger, Konigsbrunn, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 378,017, July 10, 1973, Pat. No. 3,857,252. This application Sept. 27, 1974, Ser. No. 509,903
Claims priority, application Germany, Feb. 19, 1973, 2308138
The portion of the term of this patent subsequent to Dec. 31, 1991, has been disclaimed.
Int. Cl.² D02G 3/34
U.S. Cl. 57—140 R **2 Claims**

1. An essentially smooth filament yarn with several loose filament ends sticking out, which have a flex abrasion resistance of less than 1500 cycles.

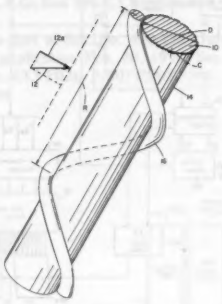
2. An essentially smooth filament yarn according to claim 1 wherein said yarn comprises fiber-forming highpolymer polyethylene-terephthalates with several loose filament ends sticking out.

3,991,550

STABILIZING LINES OR CABLES

Steven H. Cohen, 67-40 168 St., Queens, N.Y. 11365

Filed Apr. 11, 1975, Ser. No. 567,421
Int. Cl.² H02G 7/14; H01B 7/04; D07B 1/14
U.S. Cl. 57—144 3 Claims



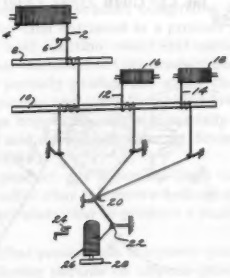
1. A line for use in a fluid medium having a fluid current with a velocity component normal to at least a portion of the line, the line being formed from a multiplicity of the elongated elements twisted together, one of said elements having a cross-section which is larger than all other elements, said all other elements defining an outer surface of the line which has a predetermined circumferential length, said one element having a cross-sectional size and shape such that it projects from said outer surface a distance equal to about $(10/\pi)\%$ of said predetermined circumferential length.

3,991,551

COMPOSITE YARN AND METHOD OF MAKING THE SAME

David W. Petree, High Point, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Division of Ser. No. 301,766, Aug. 13, 1963, abandoned. This application Jan. 9, 1969, Ser. No. 790,083
Int. Cl.² D02G 3/32
U.S. Cl. 57—152 9 Claims



1. A method for producing a composite elastic yarn which comprises the steps of:

a. providing at least one bulked thermoplastic yarn on a package,

b. unwinding said yarn from said package so as to remove the added bulk of the yarn,

c. feeding said yarn to a rotatable roll,

d. providing an elastic filament on a package,

e. feeding said elastic filament to engage said roll, the ratio of the surface speed of said roll to the feed of the elastic filament to said roll being variable to cause the elastic filament to be stretched a predetermined amount between the package and the roll,

f. feeding said filament and at least one yarn to a take-up package and imparting plying twist to said filament and yarn to form a composite yarn, and

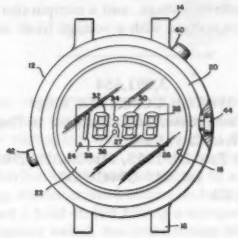
g. thereafter allowing said composite yarn to relax so as to permit the elastic filament to contract and the thermoplastic yarn to return to a bulked condition.

3,991,552

DIGITAL WATCH WITH LIQUID CRYSTAL DISPLAY

Ernest C. Ho; Norman E. Moyer, both of Newport Beach, and Richard J. Belardi, Anaheim, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 364,794, May 29, 1973, abandoned. This application Oct. 17, 1974, Ser. No. 515,797
Int. Cl.² G04B 19/24, 19/30; G04C 17/02; H05B 35/00
U.S. Cl. 58—4 A 5 Claims



1. An electronic watch structure comprising:

a support, a plurality of liquid crystal display devices mounted upon said support, an electronic circuit mounted on said support for powering said visual display device, said support, said visual display and said electronic circuit being of such size and having such electrical characteristics that they can be carried in a wristwatch and be battery-powered;

said electronic circuit comprising an oscillator and a divider for producing timed pulses of substantially constant period and counters for receiving said pulses and maintaining a plurality of sets of horological information;

a first and second pushbutton connected between said counters and said liquid crystal display devices; and

means for causing said liquid crystal display devices to continuously display a first set of horological information when said first and second pushbuttons are unactuated, to display a second set of horological information when said first pushbutton is actuated and a third set of horological information when said second pushbutton is actuated.

3,991,553

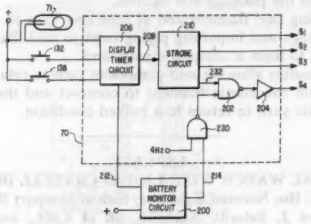
LOW VOLTAGE BATTERY INDICATOR FOR A SOLID STATE WATCH

John M. Bergey, and Arthur H. O'Connor, both of Lancaster, Pa., assignors to Time Computer, Inc., Lancaster, Pa.

Filed Oct. 31, 1974, Ser. No. 519,637
Int. Cl.² G04C 3/00; G04B 19/30, 37/12; G08B 21/00
U.S. Cl. 58—23 BA 8 Claims

1. A solid state wristwatch comprising a source of constant frequency electrical signals, a frequency divider coupled to said source, an electro-optical digital display of light emitting

diodes, a display actuator coupling said divider to said display, a battery, a manually operated demand switch for coupling said battery to said display when said display is to be energized, a low voltage circuit coupled to said display for indicating on said display when the battery is approaching the end of its useful life, means responsive to operation of said demand



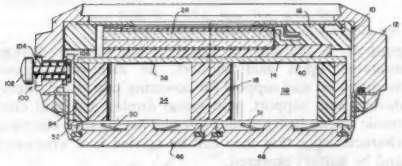
switch for coupling said battery to said low voltage circuit whereby said low voltage circuit draws energy from said battery only when said display is energized, said low voltage circuit comprising a band-gap voltage reference circuit for producing a reference voltage, and a comparator for comparing said reference voltage with a voltage from said battery.

3,991,554

WATCH CONSTRUCTION

Bela Somogyi, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 28, 1975, Ser. No. 599,798
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 BA **7 Claims**



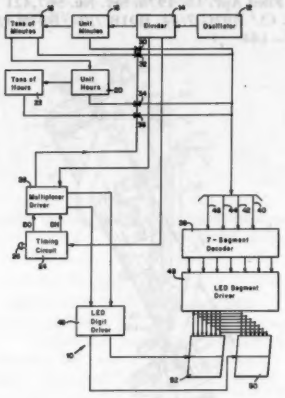
1. An electronic watch construction comprising:
a substrate having a face and having a back, said substrate being for carrying electronic watch components on the face thereof, at least one contact pad on the back of said substrate connected to the electronics on the face of said substrate;
a rear spacer block having an edge and having an upper face and being clamped with its upper face substantially against the back of said substrate, an opening in said spacer block adjacent said edge and open to said edge and adjacent said contact pad on the back of said substrate;
a conductive elastomeric contact member comprised of a synthetic polymer composition elastomer containing finely divided metal in sufficient concentration to be electrically conductive in said opening in said spacer block so that it is accessible from said edge so that electric contact can be made thereto and extending above said face of said spacer block against said contact pad to resiliently engage said contact pad to maintain electrical contact therewith and to be engageable by a switch button through the edge opening on said rear spacer block to act as a switch contact for control of watch electronics.

3,991,555

DIGITAL TIMING CIRCUIT FOR DISPLAY SEQUENCING IN TWO-DIGIT WRISTWATCH

Norman E. Moyer, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 13, 1974, Ser. No. 505,896
Int. Cl.² G04B *19/30;* **G04C** *21/32*
U.S. Cl. 58—50 R **9 Claims**



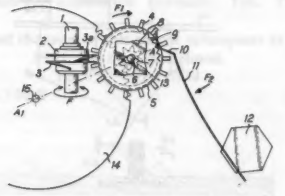
1. A digital timing circuit for regulating the timing sequence in which two different sets of horological information are displayed on two electro-optical display elements, comprising:
clock means;
counting means connected to said clock means for producng a predetermined timing sequence;
a pushbutton;
latch means for starting said timing sequence and completing it without interruption when activated by said pushbutton; and
resetting means connected between said counting means and said latch means for resetting said counting and latch means to the beginning of the timing sequence.

3,991,556

CLOCK OR WATCH MOVEMENT

Jean Renaud, Marly-le-Roi, France, assignor to Societe Jaz S.A., Paris, France

Filed May 30, 1975, Ser. No. 582,139
Claims priority, application France, June 12, 1974, 74.20395
Int. Cl.² G04B *15/00, 17/00*
U.S. Cl. 58—59 **4 Claims**



1. An horological movement comprising: a spindle assembly including an escape wheel, a pinion and a common spindle rotationally integral with said escape wheel and said pinion; a

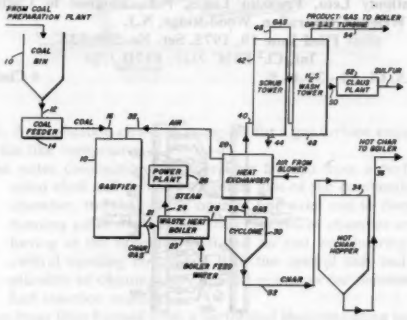
driving balance wheel for driving said escape wheel; a driven wheel rotatable about an axis by said pinion; bearing means defining oblong holes for the opposite ends of journalling said spindle, said bearing means being adapted to permit relative movement of the spindle assembly radially of said axis; and biasing means for urging the spindle assembly in the direction towards said axis.

3,991,557

PROCESS FOR CONVERTING HIGH SULFUR COAL TO LOW SULFUR POWER PLANT FUEL

Ernest E. Donath, P.O. Box 1068, Christiansted, St. Croix, V.I. 00820

Continuation-in-part of Ser. No. 490,752, July 22, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,714
Int. Cl.² F02G 3/00; C10J 3/46
U.S. Cl. 60—39.06 9 Claims



1. A process for producing low sulfur content heating fuel from solid high sulfur carbonaceous materials comprising,

introducing high sulfur carbonaceous material into a reaction vessel,

introducing preheated air into said reaction vessel,

reacting said high sulfur carbonaceous material and preheated air at a controlled temperature and rate to provide 35 – 60% gasification of said high sulfur carbonaceous material to produce a product comprising partially gasified low sulfur char entrained in a product gas,

removing from said reaction vessel said partially gasified low sulfur char entrained in said product gas,

separating said partially gasified low sulfur char from said product gas passing said partially gasified low sulfur char in to a storage hopper, storing said partially gasified low sulfur char in said storage hopper at an elevated temperature above 900° F,

purifying said product gas separated from said partially gasified low sulfur char to remove hydrogen sulfide and remaining particulate char to produce a purified product gas,

feeding said purified product gas to a power plant for power generations during periods of offpeak power demand, withdrawing said partially gasified low sulfur char from said storage hopper, and

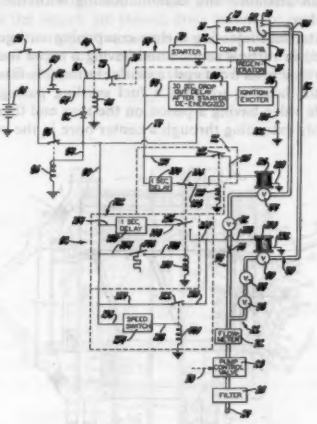
feeding said purified product gas together with said partially gasified low sulfur char withdrawn from said storage hopper to said power plant for power generation during periods of peak power demand.

3,991,558

TURBINE ENGINE STARTING FUEL CONTROL

Dennis E. Schroff, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 1, 1975, Ser. No. 636,364
Int. Cl.² F02C 7/26
U.S. Cl. 60—39.14 3 Claims



1. A turbine engine start control system for sequentially operating a starter, igniter and fuel flow to start the engine with fuel flow through a spray nozzle pilot fuel supply and thereafter to maintain burner combustion solely by means of a main fuel distribution system connected to a main fuel supply comprising: starter control means including a momentary start switch and a hold circuit having a compressor discharge pressure responsive switch for maintaining the starter energized until the engine reaches a predetermined speed, circuit means for energizing an igniter at engine start including said starter control means, a pilot fuel solenoid valve, first circuit means including a normally closed hold switch for conditioning said pilot fuel solenoid valve to supply fuel to the spray nozzle following initial energization of said starter and said igniter, a main fuel solenoid valve, second circuit means for controlling fuel flow to the main fuel distribution system through said main fuel solenoid valve including a temperature responsive switch sensing burner inlet temperature and responsive to burner temperatures above that required to vaporize fuel flow from the main fuel distribution system to concurrently open said normally closed hold switch to condition said pilot fuel solenoid valve closed and to condition said main fuel solenoid valve to supply fuel to said burner, means for deenergizing the igniter following a predetermined time delay after said starter is deenergized, and means for maintaining said main fuel solenoid energized in response to engine speed.

3,991,559

APPARATUS FOR GENERATING HIGH-PRESSURE GAS

Noriyuki Oda; Takashi Yoshida; Takeshi Nakanishi, and Kensuke Yoshikawa, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan

Filed July 16, 1975, Ser. No. 596,481
Claims priority, application Japan, Oct. 7, 1974, 49-115796
Int. Cl.² F02C 3/20, 7/22
U.S. Cl. 60—39.46 R 6 Claims

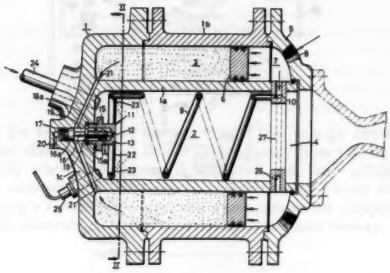
1. An apparatus for generating a high-pressure gas comprising a gas generator body including a combustion chamber and a metal fuel storage chamber surrounding the combustion chamber,

said gas generator body including an inner peripheral wall and an outer peripheral wall defining the combustion

chamber and the metal fuel storage chamber, a rear wall closing the rear ends of the combustion chamber and the storage chamber, and a front wall having an opening at the front end of the combustion chamber to provide a combustion gas outlet and closing the front end of the storage chamber,

metal fuel injecting means provided at one end of the combustion chamber and communicating with the storage chamber,

said metal fuel injecting means comprising an injector U-shaped in vertical section and having a metal fuel injecting orifice in its front end, a swirler intimately fitted in the injector housing to form a fuel swirling passageway, a needle valve having a piston on the rear end thereof and slidably extending through a center bore in the swirler to



open or close the orifice, and a spring biasing the needle valve in the direction to close the orifice, the injector housing being fitted in the front end of a blind bored portion formed in the center of the rear wall and open to the combustion chamber, the bored portion communicating with the storage chamber through passages, the piston being positioned to the rear of the passages, the spring bearing at its opposite ends against the rear surface of the piston and the bottom wall of the bored portion,

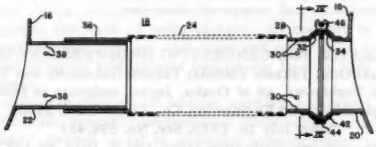
water injecting means disposed in the combustion chamber, and a water heating tube disposed within the combustion chamber and communicating with the water injecting means, so that the heat of combustion reaction within the combustion chamber melts the metal fuel in the storage chamber and heats the water passing through the tube.

3,991,560

FLEXIBLE INTERCONNECTION FOR COMBUSTORS

Serafino M. DeCorso, and Shou S. Lin, both of Media, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1975, Ser. No. 545,233
Int. Cl.² F02C 7/26
U.S. Cl. 60—39.32 **3 Claims**



1. Combustion apparatus of a gas turbine engine, said comprising a plurality of combustors disposed side-by-side in an annular array, and crossover means providing a generally closed flow path connecting each combustor with the next adjacent combustor on either side for combustion propagation from one combustor to the next therethrough, wherein said crossover means comprises:

a pair of opposed generally axially aligned short tube members extending toward each other from adjacent combustors; and,

a flexible metal tube connecting said opposed short tubes, said flexible tube comprising:

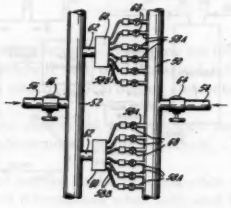
a series of adjacent tubular segments with each of said segments having a portion telescopically overlapping a portion of the next adjacent segment to provide limited fluid leakage for the entry of cooling air at each overlapping portion and also providing limited relative axial and angular movement between adjacent segments so that the resulting flexibility provided by said series of segments extending across said axial distance is sufficient to accommodate axial misalignment between said opposed short tube members along with variations in the spacial separation of said tube members due to expansion or contraction of said combustors under operating conditions.

3,991,561

DUAL-FUEL FEED SYSTEM FOR A GAS TURBINE ENGINE

Anthony Leto, Franklin Lakes, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed June 19, 1975, Ser. No. 588,323
Int. Cl.² F02C 7/22; F17D 1/04
U.S. Cl. 60—39.46 R **4 Claims**



1. A dual-fuel feed system for a gas turbine engine having a housing and a plurality of vaporizer type fuel nozzles arranged in spaced, circumferential relation to each other within the housing and around the longitudinal axis of the engine, which nozzles effect admixture of fuel and air in a combustion chamber means of the engine, the dual-fuel feed system comprising:

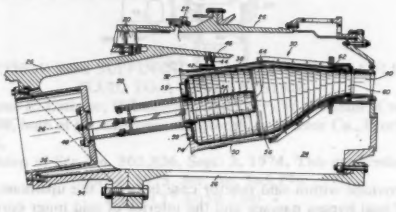
1. a first ring-shaped manifold extending exteriorly of the engine housing and generally coaxially with respect to the longitudinal axis of the engine and being connected to communicate with a source of pressurized gaseous fluid fuel;
2. a second ring-shaped manifold extending exteriorly of the engine housing and generally coaxially with respect to the longitudinal axis of the engine and being connected to communicate with a source of pressurized liquid fuel;
3. a plurality of segmental secondary manifolds arranged exteriorly of the engine housing and in circumferential relationship to each other and generally coaxial with the longitudinal axis of the engine;
4. conduit means connected to said second manifold and to each of said secondary manifolds to pass liquid fuel to the secondary manifolds;
5. a plurality of fuel feed conduits;
6. each of said fuel feed conduits having one portion thereof extending through the engine housing and being connected to communicate with said first manifold and with one of the secondary manifolds and with one of the vaporizer fuel nozzles to provide gaseous and liquid fuel flows from the respective first manifold and secondary manifold to the vaporizer fuel nozzle; and

7. flow control means for alternating flow of gaseous and liquid fuels through each of said plurality of fuel feed conduits to the vaporizer fuel nozzle associated therewith.

3,991,562
COMBUSTION CHAMBER ASSEMBLY HAVING REMOVABLE CENTER LINER

James C. Nelson, East Hartford, and Bertus Ooms, Coventry, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed July 21, 1975, Ser. No. 597,877
Int. Cl.² F02C 7/22
U.S. Cl. 60—39.65 **11 Claims**



1. A combustion chamber assembly for a gas turbine engine or the like comprising:

an outer combustion chamber liner formed from a perforated shell and defining a central axis of the combustion chamber, the shell being open at one axial end to dispel burning gases from within the combustion chamber and having at the opposite axial end an end wall bearing a central opening concentric with the central axis and a plurality of circumaxially spaced openings for receiving fuel injection nozzles;

an inner liner formed from a perforated shell extending into the outer liner along the central axis from the central opening in the end wall of the outer liner to admit air into the combustion chamber along the central axis, the perforated shell forming the inner liner being sized to be inserted into and removed from the outer liner through the central opening in the end wall of the outer liner and in the inserted position mating closely with the opening and the end wall of the outer liner to form an annular combustion chamber space adjacent the end wall and between the inner and outer liners, and

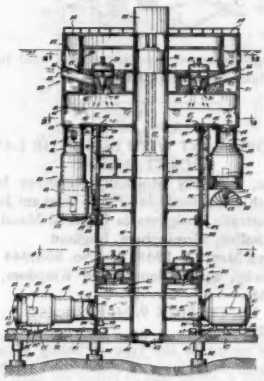
means to support said inner liner to be removable from within said outer liner without disturbing said outer liner.

3,991,563
HYDROELECTRIC POWER PLANT

Charles Pelin, R.R. 1, Box 1460, Eastsound, Wash. 98245

Filed Mar. 12, 1975, Ser. No. 557,617
Int. Cl.² F16D 33/00
U.S. Cl. 60—325 **12 Claims**

1. A hydroelectric power plant comprising a columnar housing erected in a body of water and defining a chamber therewithin at a level below the surface of the body of water and a series of penstocks which open into the body of water at points about the perimeter of the housing between said level and the surface of the body of water and which discharge into said chamber; hydroelectric power generating means including turbines in the penstocks and means for discharging the tailwater from the respective turbines including nipples on the housing which communicate with the chamber and open into the body of water at levels below that of the chamber, and which have open ended thimble-like vessels telescopically engaged thereon, to be extended and retracted in relation to the respective nipples axially thereof, said nipples and vessels having float operated check valves therein adjacent the chamber and the end openings of the vessels, respectively, each of which valves is adapted to permit flow in the direction relatively from the chamber toward the body of water when open, and to prevent flow in the opposite direction when closed, and there being additional valve means in the tailwater discharge means which are adapted to equalize the pressure in the vessels with that in the body of water when the respective check valves in the vessels are closed, drive means for extending and retracting the respective vessels, and control means which are connected to the drive means and operative through the same (1) to extend and retract the respective vessels in staggered



sequence about the circumference of the housing, with each vessel undergoing an at-rest period between the respective retraction and extension stages thereof when the vessel is fully retracted, and (2) to control the rate of extension and retraction of the respective vessels, and the length of their respective rest periods, as a function of the water level in the chamber, the vessels each being adapted in buoyancy to hover in equilibrium in the body of water when at rest, and the number of nipples and vessels being adapted in relation to the number of penstocks and turbines so that the vessels collectively discharge the tailwater from the turbines at a rate adapted to maintain the water level in the chamber between predetermined limits.

3,991,564
DUAL PRESSURE LEVEL OIL SUPPLY SYSTEM

Harry A. Mayor, and George W. Minkkinen, both of Fitchburg, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,169
Int. Cl.² F16D 31/06
U.S. Cl. 60—325 **8 Claims**

1. A multi-pressure, hydraulic fluid supply system for a turbomachine, the turbomachine of the type having at least one high pressure fluid input and at least one low pressure fluid input; the hydraulic fluid supply system comprising:

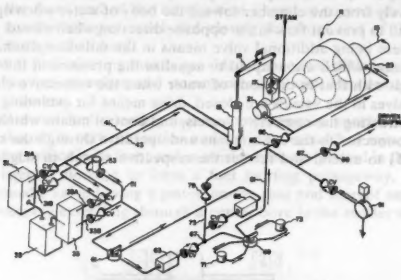
at least one hydraulic pump having an inlet end connected to a hydraulic fluid source;

at least one high pressure discharge port from said hydraulic pump;

at least one low pressure discharge port from said hydraulic pump; and,

a high pressure fluid pipe and a low pressure fluid pipe

interconnecting said pump high pressure discharge port and said pump low pressure discharge port with said



turbine high pressure fluid input and said turbine low pressure fluid input, respectively.

3,991,565

SOLID PROPELLANT WITH INHIBITOR LAYER IN ROCKET MOTOR

Stuart Gordon, Cleobury Mortimer; Geoffrey Ian Evans, Bewdley, both of England, and Philip Graham Jones, Maribyrnong, Australia, assignors to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

Filed Mar. 12, 1969, Ser. No. 808,044

Claims priority, application United Kingdom, Mar. 28, 1968, 14960/68

Int. Cl.² F02K *9/04;* **F42B** *1/00*

U.S. Cl. 60—255 **6 Claims**

1. A rocket motor of the type including a case, a solid propellant charge and a layer of combustion inhibiting cellulosic derivative on some of the surfaces of the propellant charge, wherein the improvement comprises the inclusion of layer of an elastomeric compound resistant to permeation by combustible components of the propellant charge bonded between said propellant surfaces and the layer of cellulosic derivative with a layer of phenol formaldehyde and polyvinyl formal resin and between the elastomeric layer and the layer of cellulosic derivative by a resin.

3,991,566

MANIFOLD REACTOR WITH AUXILIARY CHAMBER FOR SECONDARY AFTERBURNING DURING START-UP

Hiroshi Sami; Kaoru Taira, and Teruo Kumai, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

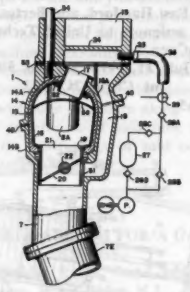
Filed July 7, 1975, Ser. No. 593,331

Claims priority, application Japan, Feb. 27, 1975, 50-24194

Int. Cl.² F01N *3/10, 7/10;* **F02M** *31/08*

U.S. Cl. 60—289 **8 Claims**

1. A thermal reactor for an internal combustion engine comprising a reactor case; an inner core within said reactor case forming a reaction chamber, said inner core being supported by said case through a thermal resistant layer and being connected with an exhaust manifold of an engine; exhaust gas inlet pipes supported by said reactor case for introducing exhaust gas into said inner core; an outlet exhaust pipe, a connection portion on the under side of the inner core for connecting the interior of said inner core to said outlet exhaust pipe; a heat control valve disposed in said connection portion; wall means defining a bypass passage between said reactor case and said inner core, the upstream end of said bypass passage communicating with the interior of said inner core and the downstream end of said bypass passage communicating with said connection portion at a position downstream of the heat control valve to communicate the interior of the inner core directly with the outlet exhaust pipe when said heat control valve is substantially closed; a connecting part on said reactor case for connecting an intake pipe to an intake manifold of the engine; a riser member provided adjacent said connecting part, said riser member comprising a portion of the wall means defining the upstream end of the bypass passage; an air injection nozzle provided adjacent the riser member to supply secondary air into the bypass passage along the riser member; and at least one communicating pipe



provided within said reactor case between the upstream end of said bypass passage and the interior of said inner core for introducing the secondary air from the air injection nozzle into the inner core when said heat control valve is opened and for guiding gas outflow from the inner core toward the riser member and thence through said bypass passage directly to said outlet exhaust pipe when said heat control valve is substantially closed.

3,991,567

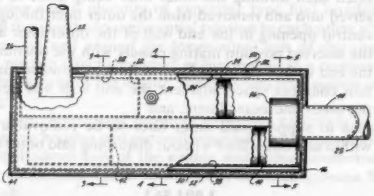
VORTICAL FLOW EXHAUST GAS REACTOR

Claude Morris Brimer, 4345 N. Camino Cardenal, Tucson, Ariz. 85716

Filed May 21, 1975, Ser. No. 579,482

Int. Cl.² F01N *3/10*

U.S. Cl. 60—303 **9 Claims**



1. An exhaust gas processing device for use with a combustion engine comprising:

an exhaust inlet pipe connected to receive the gaseous combustion product from said engine;

a reactor member including a housing containing first and second nonconcentric side by side chambers of substantially cylindrical cross-section, each of said chambers being spaced from said housing and a passage comprising a duct interconnecting said chambers tangentially with respect to each said chamber, air inlet means communicating with said first chamber,

an exhaust outlet from said housing,

an exhaust inlet port in the side wall of said first chamber at one end thereof, said exhaust pipe connecting with said exhaust inlet port substantially tangentially with respect to said first chamber and causing the exhaust stream to be directed tangentially against the cylindrical surface of said first chamber in a plane almost perpendicular to the

axis of said chamber whereby said exhaust stream is constrained into a vortical pattern having high angular velocity in a helical path flowing toward said interconnecting passage, through said passage to said second chamber thereby continuing said vortical flow pattern in a reverse axial direction through said second chamber and abutting against an end wall of said housing and being again redirected axially over at least the outside wall of one of said chambers before being exhausted to the atmosphere, at least one annular flame holder member extending from the inside wall of said first chamber toward its axis and exposed to said exhaust stream,

ignition means in said first chamber exposed to said exhaust stream, and

an engine-driven air pump for supplying compessed are to said air inlet means.

3,991,568

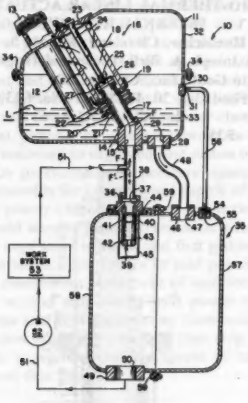
METHOD FOR SUPPLYING UNAERATED HYDRAULIC FLUID TO A WORK SYSTEM

Eugene E. Latimer, Wilmington, and Larry W. Lorimor, Crest Hill, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 502,826, Sept. 3, 1974. This application Apr. 4, 1975, Ser. No. 565,176

Int. Cl.² E03B *1/00*

U.S. Cl. 60—327 **3 Claims**



1. A method for continuously supplying unaerated hydraulic working fluid to a work system comprising the steps of

maintaining a predetermined level of hydraulic working fluid in a first tank,

maintaining a second tank at its full capacity with said hydraulic working fluid by continuously communicating an unobstructed flow of hydraulic working fluid in closed communication from said first tank to said second tank under the influence of gravity,

pumping pressurized and unaerated hydraulic working fluid in closed communication from said second tank, through said work system to translate energy of said hydraulic working fluid into mechanical energy and back to said first tank and

by-passing communication of hydraulic working fluid back to said first tank when the pressure level at an inlet thereof exceeds a predetermined level by communicating such hydraulic working fluid from said work system to said second tank directly.

3,991,569

FUEL CONTROL SYSTEM FOR GAS TURBINE ENGINE

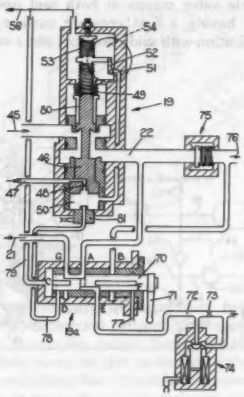
Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed July 3, 1975, Ser. No. 592,734

Claims priority, application United Kingdom, Aug. 1, 1974, 33939/74

Int. Cl.² F02C *9/08, 9/10*

U.S. Cl. 60—39.28 R **8 Claims**



1. A fuel control system for a gas turbine engine, comprising a pump, a spill valve responsive to a first servo pressure signal to spill fuel from the outlet of said pump, a variable metering device downstream of said pump, a control valve downstream of said metering device, said control valve including an element movable in response to a second servo pressure signal to vary fuel flow to the engine, and an electrically-operated pilot valve responsive to an increase in engine speed to vary said second servo pressure signal in a sense to decrease fuel flow to the engine, a further pilot valve, responsive to the total pressure drop across said metering device and said control valve, for controlling said first servo pressure signal, an increase in said pressure drop varying said first servo pressure signal in a sense to cause said spill valve to increase spill flow, and a selector valve in parallel with said electrically-operated pilot valve, said selector valve being operable in one position to vary said second servo pressure signal so as to shut said control valve and to vary said first servo pressure signal in a sense to increase spill flow.

3,991,570

HYDRAULIC ACCUMULATOR PRESSURE RELEASE VALVE AND SYSTEM

James E. Keller, Vancouver, Wash., assignor to Western Fluid Power Corporation, Portland, Oreg.

Filed Sept. 29, 1975, Ser. No. 617,399

Int. Cl.² F15B *1/02*

U.S. Cl. 60—413 **11 Claims**

1. An accumulator pressure release valve for a hydraulic power supply means having a hydraulic fluid pump for supplying fluid under pressure from a source of hydraulic fluid through a check valve to a hydraulic power system in which a hydraulic pressure accumulator helps maintain system pressure, said accumulator pressure release valve comprising:

a valve body,

pilot port in said valve body for communication with the discharge side of said pump between said pump and said check valve,

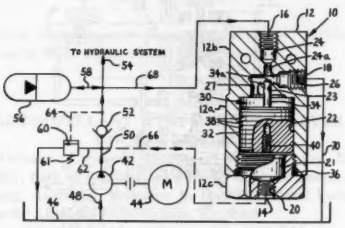
an accumulator port in said valve body for communication with said hydraulic accumulator,

a return port in said valve body for communication with said hydraulic fluid source,

internal valve passage means in said valve body interconnecting said pilot, accumulator and return ports,

a movable valve means movable within said internal valve passage means between an open position enabling fluid communication between said accumulator port and said return port and a closed position blocking fluid communication between said accumulator port and said return port,

said movable valve means in both said open and closed positions having a first pressure surface area in fluid communication with said pilot port and a second pressure



surface area opposed to said first pressure surface area in fluid communication with said accumulator port,

said first pressure surface area in said closed position being greater than said opposed second pressure surface area such that upon operation of said pump fluid pressure acting through said pilot port against said first pressure surface area maintains said movable valve means in its closed position to maintain system and accumulator pressure and upon deactivation of said pump fluid pressure acting through said accumulator port against said second pressure surface area moves said movable valve means to its open position to release system and accumulator pressure.

3,991,571

FLUID SYSTEM OF A WORK VEHICLE HAVING FLUID COMBINING MEANS AND SIGNAL COMBINING MEANS

Howard L. Johnson, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

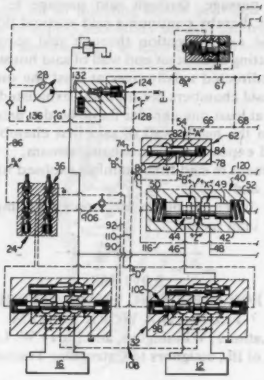
Filed Mar. 15, 1976, Ser. No. 667,228
Int. Cl.² F15B *13/09*; F16H *39/46*
U.S. Cl. 60—422 **11 Claims**

1. In a fluid system of work elements of a work vehicle having a pilot pump and first and second fluid circuits, each fluid circuit having a pump connected to a respective work element through a control valve assembly for controlling the flow of fluid from the respective pump to the respective work element, a pair of primary pilot control valves each positioned between the pilot pump and a respective control valve assembly for altering a pilot pump signal and delivering resultant signals, and fluid control means for controllably passing fluid between the first and second fluid circuits in response to said resultant signals from the first and second primary pilot control valves, the improvement comprising:

signal means for sensing the load pressure of each circuit and delivering respective first and second control signals;

signal means for controllably delivering the larger of said first and second control signals as a pump control signal in response to the magnitude of said resultant signals of each circuit; and

pump control means associated with each pump for receiving the pump control signal and controlling the output of the respective pump in response thereto.

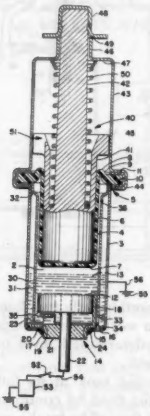


3,991,572

ELECTRO-THERMAL LINEAR ACTUATOR WITH INTERNAL RESERVOIR

Richard G. Huebscher, Cleveland; Ronald S. Sobecks, Seven Hills, and Joseph A. Birli, Richmond Heights, all of Ohio, assignors to Gould Inc., Chicago, Ill.

Filed Oct. 20, 1975, Ser. No. 623,669
Int. Cl.² F03G *7/06*
U.S. Cl. 60—531 **11 Claims**

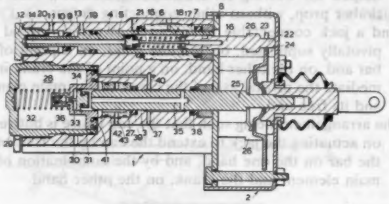


1. A thermal actuator, comprising a main body, means for forming a variable volume fluid chamber with said main body, a thermally expansible fluid in said fluid chamber, means for applying heat to at least a portion of said fluid to cause expansion thereof tending to increase pressure in said fluid chamber, and means for partitioning said fluid chamber normally to store a quantity of said fluid remote from said means for applying heat, said means for partitioning including means for feeding fluid to said means for applying heat to avoid overheating of the latter.

3,991,573
MASTER CYLINDER ASSEMBLIES FOR VEHICLE HYDRAULIC BRAKING SYSTEMS

David Anthony Harries, Solihull, England, assignor to Girling Limited, Birmingham, England

Filed Feb. 13, 1975, Ser. No. 549,476
Claims priority, application United Kingdom, Feb. 13, 1974, 6447/74; June 4, 1974, 24597/74; Nov. 30, 1974, 51962/74
Int. Cl.[2] F15B 7/00, 11/10
U.S. Cl. 60—550 32 Claims



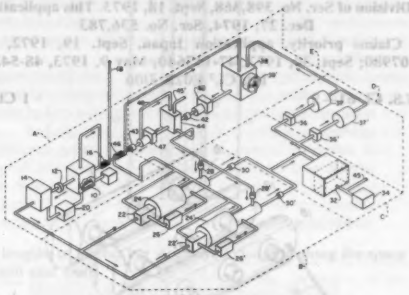
1. A master cylinder assembly for a vehicle braking system comprising a housing, a first piston in said housing, a first stop with which said first piston is engagable in a retracted position and away from which said first piston is movable into an operative position, a second piston in said housing aligned axially with said first, a second stop with which said second piston is engagable in a retracted position and away from which said second piston is movable towards said first piston into an operative position, a pressure space in said housing between said first and second pistons, said housing having an outlet from said pressure space for connection to a wheel brake, means in said housing defining a power chamber on the side of said first piston opposite said pressure space and adapted to be pressurised to urge said first piston towards said second piston to pressurise said pressure space, a pedal-operated valve assembly for controlling a supply of fluid under pressure to said power chamber, and a connection between said pedal and said second piston to transmit a force to said second piston to urge same towards said first piston to pressurise said pressure space upon failure of said power chamber, said connection disallowing movement of said second piston away from said second stop whilst said power chamber is pressurised to urge said first piston away from said first stop, and said first piston engaging with said first stop when said pressure space is pressurised by movement of said second piston towards said first piston.

3,991,574
FLUID PRESSURE POWER PLANT WITH DOUBLE-ACTING PISTON

Larry Vane W. Frazier, 1460 Exeter Ave., Ventura, Calif. 93003

Filed Feb. 3, 1975, Ser. No. 546,229
Int. Cl.[2] F01K 27/00
U.S. Cl. 60—645 9 Claims

1. A fluid pressure power plant comprising:
a. heat energy generating means for producing hydraulic steam;
b. a double-acting intensifier piston having at least two working area surfaces and at least two hydraulic fluid pumping surfaces;
c. valve means activated by said working area surfaces of said double-acting intensifier piston and hydraulic steam from said heat energy generating means for opening and closing a plurality of steam ports to supply steam expansion chambers containing said working area surfaces of said double-acting intensifier piston with a predetermined minimum amount of steam to efficiently operate said piston by steam expansion at its natural resonance frequency independently of load conditions;
d. first hydraulic fluid valve means for supplying hydraulic fluid from a low pressure reservoir to said hydraulic fluid pumping surfaces;
e. second hydraulic valve means for exhausting hydraulic fluid from said hydraulic fluid pumping surfaces at a high pressure;

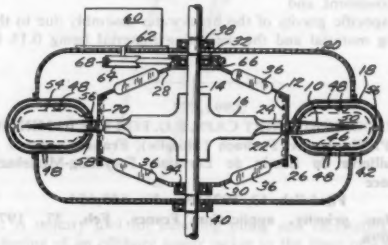


f. means for accumulating high pressure hydraulic fluid exhausted by said second hydraulic valve means;
g. means for developing power from said high pressure hydraulic fluid stored in said means for accumulating;
h. means for controlling flow of said high pressure hydraulic fluid from said means for accumulating to said means for developing power; and
i. means for returning hydraulic fluid from said means for developing power to said low pressure reservoir.

3,991,575
METHOD AND APPARATUS FOR CONVERTING HEAT ENERGY TO MECHANICAL ENERGY

Leo L. Bailey, Lake Worth, and David R. Kimmel, Lantana, both of Fla., assignors to Bailey and Kimmel, Inc., Lake Worth, Fla.

Filed July 23, 1974, Ser. No. 491,128
Int. Cl.[2] F01K 11/00
U.S. Cl. 60—669 18 Claims



1. A method of continuously converting heat energy into mechanical energy, comprising:
rapidly heating a first portion of a liquid in a fluid containing reservoir, to a sufficient temperature to cause rapid vaporization of said portion;
expelling a second portion of said liquid through an opening in said reservoir by means of a pressure created in said reservoir due to the rapid vaporization of said first liquid portion;
directing said expelled second portion of said liquid against one of a plurality of blades secured for rotation about a fixed axis, so as to cause said blades to rotate; and

resupplying liquid to said reservoir and thereby expelling said vaporized first portion through said opening.

3,991,576

FLOATING BREAKWATER

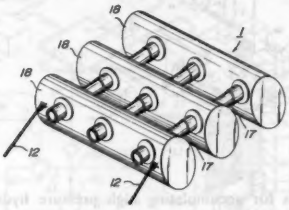
Sandanori Tazaki, Kodairo, and Yozo Ishida, Kunitachi, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Division of Ser. No. 398,368, Sept. 18, 1973. This application Dec. 27, 1974, Ser. No. 536,783

Claims priority, application Japan, Sept. 19, 1972, 47-107980; Sept. 30, 1972, 47-113640; May 9, 1973, 48-54312

Int. Cl.² E02B *3/06*

U.S. Cl. 61—5 **1 Claim**



1. A floating breakwater assembly, comprising:

a plurality of parallel hollow substantially equally dimensional cylindrical shells fabricated from a rigid material each shell having an upper and lower portion, said upper portion housing a floating material as a floating source and said lower portion housing a weighting material as a source for increasing weight, both ends of each shell being closed,

a plurality of rigid cylindrical bonding members having a diameter smaller than that of the cylindrical shells and penetrating transversely through the cylindrical shells to thereby rigidly bond said shells together so that said shells are arranged parallel to one another,

said upper portion of each shell projecting upwardly and out of the water along its entire length to a height of at least one-half of the average height of waves to be broken,

means for mooring the breakwater to the sea bottom maintaining the shells perpendicular to the direction of wave movement, and

the specific gravity of the breakwater assembly due to the floating material and the weighting material being 0.15 to 0.75.

3,991,577

TELESCOPIC SUPPORT CAPS, E.G. FOR USE IN MINING

Jean P. Thevenoux, Forbach (Moselle), France, assignor to Houilleres du Bassin de Lorraine, Freyming-Merlebach, France

Filed Feb. 13, 1976, Ser. No. 658,054

Claims priority, application France, Feb. 27, 1975, 75.06098

Int. Cl.² E21D *15/14*

U.S. Cl. 61—45 C **8 Claims**

1. In a support cap of telescopic construction, the combination of the following means assembled together:

a main element in the form of a generally straight beam having one end, referred to as the support end, and another end, referred to as the extensible end,

a straight bar adapted to slide relative to the main element and having one end slidingly connected to the main element and another, free end projecting outwardly of the main element on the side of the extensible end,

a crank with two ends, a pivot with a transverse axle connecting one end of the crank to the main element by being fixed thereto adjacent the said support end at a distance from the latter which is less than the length of the crank, the other end of the crank being a free end shaped for bearing on an auxiliary element, such as a timber prop, without other connecting means,

and a jack connectable to a source of pressure-fluid and pivotally supported, on the one hand, on a point of the bar and, on the other hand, on a point of the crank intermediate the pivotal axis of the crank on the main element and its free end,

the arrangement being such that the cap in use is buttressed on actuating the jack to extend the cap by the free end of the bar on the one hand, and by the combination of the main element and the crank, on the other hand.

3,991,578

SELF-ADVANCING MINE ROOF SUPPORTS

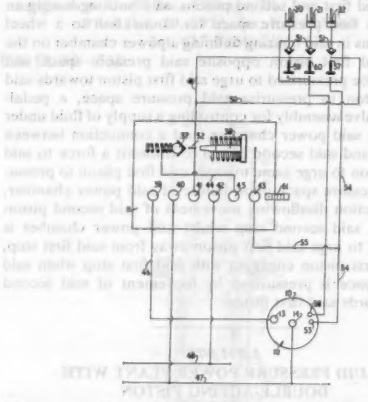
John Cooke, Bolton, and Derek Alker, Wigan, both of England, assignors to Gullick Dobson Limited, Wigan, England

Filed Mar. 21, 1975, Ser. No. 560,723

Claims priority, application United Kingdom, Apr. 10, 1974, 14807

Int. Cl.² E21D *15/44*; F15B *21/02*

U.S. Cl. 61—45 D **14 Claims**



1. Control means for a mine roof support comprising a control valve having selectable positions including a prop extend position in which a supply of pressure-fluid is selected to operate extensible prop means of the support and a prop release position in which the extended prop means are selected for release, and a valve device intercoupled with the control valve by pressure-fluid lines and including means movable to a first position in response to selection of said prop extend position by said control valve and, when in said first position, for providing a supply of pressure-fluid to said prop means of the support, said valve device also including pressure-fluid connection means connected to the pressure-fluid supply of said prop means for keeping said valve device in said first position when the control valve is moved from said prop extend position for maintaining pressure-fluid supply to said prop means until said control valve is moved to said prop release position to release said pressure-fluid connection

means for permitting said valve device to move to a second position for release of said prop means.

3,991,579

SELF ADVANCING SUPPORT CHOCKS

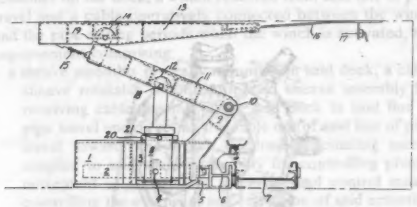
Pierre Deffontaine, Wittenheim, France, assignor to Mines de Potasse d'Alsace S.A., Mulhouse, France

Filed Dec. 2, 1974, Ser. No. 528,641

Claims priority, application France, Nov. 30, 1973, 73.42655

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D 14 Claims



1. A self-shielding support chock for use in mine galleries proximate the mining face in mines having horizontal or moderately dipping veins comprising:

a base;

a cap for interacting with the upper surface of the vein, said cap having sufficient area to cover the other elements of the chock when said cap is interacting with said upper surface;

at least one lever arm articulated at one end at a first articulation point on said base toward the front thereof in the direction of the mining face and articulated at the other end at a second articulation point on said cap toward the rear thereof away from the mining face; and

a prop supported on said base, one end of said prop being in engagement with said at least one lever arm, said pro containing means for raising and lowering said at least one lever arm.

3,991,580

MINE ROOF SUPPORTS

Archelaius Dawson Allen, Leyland, England, assignor to Gullick Dobson Limited, Wigan, England

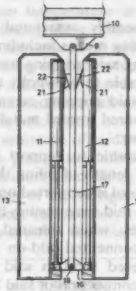
Filed Aug. 28, 1975, Ser. No. 608,675

Claims priority, application United Kingdom, Nov. 15, 1974, 49427/74

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D 10 Claims

1. A self-advancing mine roof support comprising a roof-engaging structure, a ground-engaging structure, hydraulically extensible means arranged between said floor-engaging and roof-engaging structures and operable to adjust the position of said roof-engaging structure relative to said ground-engaging structure, and advancing means operable to advance said support relative to an anchorage means, wherein said ground-engaging structure comprises a pair of longitudinally extending laterally spaced skids and said advancing means comprises a pair of pressure-fluid-operated ram devices each located adjacent one of said skids and both connected rearwardly of



their lengths to a relay bar structure extending along the space between said skids.

3,991,581

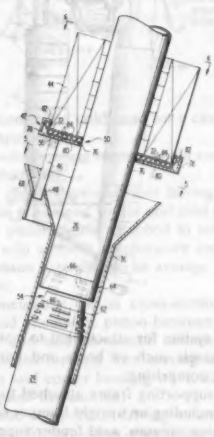
METHOD AND APPARATUS FOR HANDLING PILING AND ANCHORING AN OFFSHORE TOWER

Alfred Reeves Kolb, Corleston on Sea, England, assignor to Brown & Root, Inc., Houston, Tex.

Filed June 2, 1975, Ser. No. 582,677

Int. Cl.² E02B *17/00*

U.S. Cl. 61—53.5 10 Claims



1. A unitary tool for handling piling and facilitating the anchoring of an offshore tower jacket to the floor of a body of water, said offshore tower jacket comprising:

a length of piling;

pile guiding means for supporting said length of piling, the pile guiding means at least partially enclosing said length of piling, and

said length of piling being connected to and disposed within said pile guiding means;

said tool comprising:

a base operable to rest upon an upper end of said pile guiding means;

releasable gripping means connected to said base, said releasable gripping means including

means for gripping an add-on piling;

said length of piling and said add-on piling having matable connection means;

connecting means connected with said base and operable to effect interconnection of said length of piling and said add-on piling

releasing means operably associated with said gripping means, said releasing means including means for releasing said gripping means;

said tool being operable to be wholly suspended from said add-on piling by said gripping means while said add-on piling is being lowered toward matable engagement with said length of piling;

said tool being operable to support said interconnected add-on piling and length of piling through said gripping means while said tool is supported on said end of said pile guiding means by said base resting thereon; and

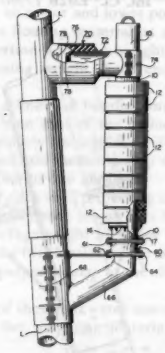
said releasing means, when released, being operable to permit said interconnected add-on piling and length of piling to be lowered through said pile guiding means subsequent to disconnection of said length of piling from said pole guiding means.

3,991,582

ROTATING-BUMPER FENDER SYSTEM

Tom C. Waldrop, and Clarence T. Thomerson, both of Arlington, Tex., assignors to Regal Tool & Rubber Co. Inc., Arlington, Tex.

Filed Sept. 24, 1974, Ser. No. 508,776
Int. Cl.² E02B *3/22*; B63B *21/04*; F16F *7/12*
U.S. Cl. 61—48 **7 Claims**



1. A fender system for attachment to a stable structure for fending off vessels such as boats and barges being landed thereadjacent; comprising:

a. a fender supporting frame attached to said stable structure and including an upright bumper supporting circular cross-section column, said fender supporting frame further including upper and lower mounting members securing said bumper supporting column to the stable structure and the upper and lower members including yieldable shock absorbing members comprising energy absorbing shear mounts having metal plates alternating with layers of molded elastomer bonded thereto; and

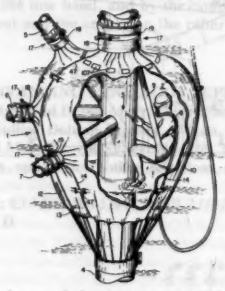
b. a plurality of similar elastomeric bumpers surrounding said upright column in mutually stacked relationship, each bumper comprising a thick wall resilient cylindrical body having end walls and having an inner diameter which is cylindrical and has an inner periphery sized to loosely receive and freely rotate on said column and each inner periphery having an antifriction layer of material harder than the elastomeric body, and each bumper having an outer diameter which is large as compared with the bumper's axial length, and the end walls of the bumpers being disposed so that they mate with the end walls of adjacent bumpers in the stack so as to provide a composite outer bumper surface which is substantially smooth and continuous and cylindrical so as to resist separation of the bumpers upon contact by a vessel.

3,991,583

METHOD OF PROVIDING AN UNDERWATER ENCLOSURE

John T. Scurlock, 6209 Schouest, Metairie, La. 70003

Division of Ser. No. 349,709, April 10, 1973, Pat. No. 3,837,171, which is a continuation of Ser. No. 112,861, Feb. 5, 1971, abandoned, which is a continuation-in-part of Ser. No. 843,543, July 22, 1969, abandoned. This application Sept. 16, 1974, Ser. No. 506,606
Int. Cl.² B63C *11/36*; E04B *1/343*
U.S. Cl. 61—69 R **10 Claims**



1. The method of providing an enclosure, at least a part of which is in water, comprising the following steps:

a. providing an enclosure structure comprising a multiple number of separate but joinable, extended, flexible sheet sections of flexible, pliable, sheet material, and joining means mounted at the edges of said sections for joining them together, said sections when joined together having at least one aperture therein and a relatively large bottom opening;

b. providing an outer enclosing net of mesh material following the general configuration of said sheet sections when joined together but defining substantially less enclosed volume than said sheet sections when joined together and when fully extended;

c. submerging at least a substantial portion of said enclosure structure into the water;

d. placing and forming the enclosure structure about the rigid structure in its flexible condition and joining said sections together so that the rigid structure goes through said aperture;

e. fitting said aperture around the rigid structure;

f. securing the bottom opening under the water surface to the rigid structure at a position lower than said aperture forming an inverted bag-like structure from said enclosure structure, at least a part of which is under water;

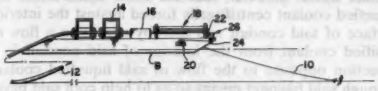
g. placing said net on the exterior of said sheet sections; and

h. inflating the inner volume defined by said enclosure structure with a gaseous medium which supports it by its expansive pressure, said net preventing the creation of any substantial, damaging lateral or surface stresses on said joining means during inflation; whereby an inflated enclosed underwater workspace having an internal gaseous environment therein is provided in the water about the rigid structure, said internal environment being different from that on the outside of said enclosure structure.

3,991,584
SHOCK ABSORBING AND RETRACTING SYSTEM FOR PIPE LAYING VESSEL

Henry T. Goldbach, Seattle, Wash., assignor to Western Gear Corporation, Everett, Wash.

Filed Jan. 31, 1975, Ser. No. 545,795
Int. Cl.² F16L 1/00; B63B 35/04
U.S. Cl. 61—111 8 Claims



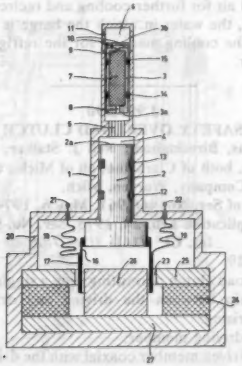
1. A cable shock-absorbing system for use in combination with a pipe laying vessel having a pipe handling deck, including a line of pipe travel above the deck, at least one pipe tensioner on the deck, a winch removed from said line of pipe travel and a cable operatively connected between the winch and the pipe during periods when the winch is activated, the improvement comprising:

a sheave assembly pivotally mounted on said deck, a cable sheave rotatably mounted on said sheave assembly for receiving cable passing above said deck in said line of pipe travel and directing the cable out of said line of pipe travel toward said winch, extensible actuating means coupled to said sheave assembly for controlling pivotal movement of said sheave assembly, and control means controlling the extension and retraction of said actuating means in response to changes in cable tension for swinging said sheave assembly in the direction of cable movement toward the winch during increases in cable tension and in the direction of cable movement away from the winch during decreases in cable tension whereby transient changes in the tension in the cable can be absorbed to maintain an approximately constant tension in the cable.

3,991,585
COLD-GAS REFRIGERATOR

Jan Mulder, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 5, 1974, Ser. No. 529,824
Claims priority, application Netherlands, Apr. 29, 1974, 7405725
Int. Cl.² F25B 9/00
U.S. Cl. 62—6 8 Claims

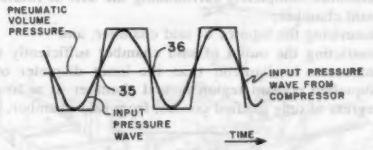


5. In a cold gas refrigerator operable with a source of alternating current having frequency f_o, and including a housing, compression and expansion pistons reciprocally movable in corresponding cylinders and defining therewith variable volume compression and expansion spaces in which a working medium performs a thermodynamic cycle, with a relatively higher mean temperature in the compression space and a relatively lower mean temperature in the expansion space, said refrigerator including drive means for driving said compression piston the movement of which generates pressure variations in the working medium which drive said expansion piston, with a phase difference between said pistons, the improvement in combination therewith wherein said drive means comprises a linear electric motor activated by said source of a.c. current, and an armature of said motor reciprocally driving said compression piston, said armature, compression piston, and working medium comprising a system which resonates during operation of the refrigerator at a resonant frequency f which at least substantially corresponds to the frequency f_o and which satisfies the relation.

3,991,586
SOLENOID CONTROLLED COLD HEAD FOR A CRYOGENIC COOLER

Timothy T. Acord, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,155
Int. Cl.² F25B 9/00
U.S. Cl. 62—6 7 Claims



1. A solenoid controlled cold head for a closed cycle cryogenic cooler comprising:

an enclosed cooler housing having a cold end and an ambient temperature end;

a free moving regenerator-displacer having a regenerator matrix therein positioned within said cold end and having a pneumatic piston rigidly attached to said regenerator-displacer at said ambient temperature end wherein said pneumatic piston extends into an average pressure pneumatic volume;

an effective pneumatic piston cross-sectional area on a portion of said pneumatic piston between said regenerator-displacer and said pneumatic volume that provides movement means for said free moving regenerator-displacer within said cooler housing when differential pressures are applied thereacross;

a compressor and compressor driving means mechanically linked together for providing alternating pressure waves of a light gas enclosed within said closed cycle and in communication with said regenerator-displacer for cyclically applying differential pressures across said effective pneumatic piston cross-sectional area to move said regenerator-displacer reciprocally within said cooler housing; and

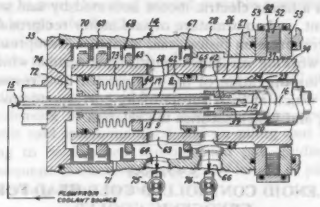
a control means comprising a synchronizing means sensing and reacting to the phase of said alternating pressure waves and solenoid control means responding to said synchronizing means for moving said pneumatic piston and said regenerator-displacer rigidly attached thereto when said alternating pressure waves are at their maximum and minimum for providing in-phase operation causing more work and more refrigeration at said cold end.

3,991,587

METHOD OF SUPPLYING CRYOGENIC FLUID THROUGH A TRANSFER JOINT EMPLOYING A STEPPED BAYONET RELATIVE-MOTION GAP

Evangelos T. Laskaris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 573,169, April 30, 1975. This application Feb. 27, 1976, Ser. No. 662,103
Int. Cl.² F17C 7/02
U.S. Cl. 62—55 2 Claims



1. In the method of supplying only gasified coolant to a conduit from a chamber containing both liquefied and gasified coolant therein, said chamber having a coolant outlet, the steps of:

rotating said chamber so as to centrifugally force the liquefied portion of said coolant outward against a wall of said chamber completely surrounding the axis of rotation of said chamber;

pressurizing the interior of said chamber; and

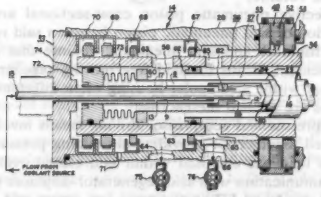
constricting the outlet of said chamber sufficiently to be narrower in diameter than the inner diameter of the liquefied coolant region in said chamber so as to allow egress of only gasified coolant from said chamber.

3,991,588

CRYOGENIC FLUID TRANSFER JOINT EMPLOYING A STEPPED BAYONET RELATIVE-MOTION GAP

Evangelos T. Laskaris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,169
Int. Cl.² F17C 7/02
U.S. Cl. 62—55 4 Claims



1. In cryogenic apparatus including a rotor wherein the interior portion thereof is bathed in liquefied coolant at cryogenic temperatures, a joint for supplying said liquefied coolant to a conduit within said rotor rotating in unison with said rotor, said joint comprising:

a hollow shaft coupled to said rotor so as to be rotatable therewith, said conduit extending from said rotor into the hollow interior of said shaft;

stationary bayonet means having an outlet penetrating into the interior of said conduit and delivering said liquefied coolant from said outlet into the interior of said conduit, said liquefied coolant within said conduit being centrifugally forced against the interior surface of said conduit; and

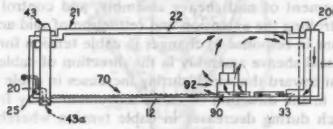
annular means rigidly coupled to the wall of said conduit and rotatable in unison therewith, said annular means being disposed concentrically about, and spaced apart from, said bayonet means so as to define a relative-motion gap therewith, said relative-motion gap having a smaller outer diameter than the inner diameter of the liquefied coolant centrifugally forced against the interior surface of said conduit and thereby admitting a flow of gasified coolant from the interior of said conduit in a direction opposite to the flow of said liquefied coolant through said bayonet means so as to help cool said bayonet means while precluding entry of liquefied coolant into said gap from the interior surface of said conduit.

3,991,589

AIR CONDITIONED TRANSPORT OF PRODUCE

Eric Rath, La Jolla, Calif., and George C. Mauder, Jr., Brooklyn, N.Y., assignors to Frigitemp Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 243,695, April 13, 1972, Pat. No. 3,958,427. This application Aug. 15, 1972, Ser. No. 280,815
Int. Cl.² F25D 17/06
U.S. Cl. 62—62 2 Claims



1. The method of transporting produce in a fresh condition in a barge comprising: storing fresh produce within a barge, cooling air by a refrigeration process having a cooling medium, extracting water as condensate from said air during said cooling; collecting said extracted water and storing it on the floor of said barge; forcing the cooled air under pressure along the floor of the inner portion of said barge and over the stored water and beneath the stored produce in such manner that the cooled air is humidified and a plenum chamber effect is achieved and a portion of such air circulates upwardly through the produce throughout the entire length of said barge; drawing the air so circulated through said barge and produce along the lower side of the deck of said barge back to the place of cooling of said air for further cooling and recirculation in the above manner, the water in which the barge is resting is utilized to cool the cooling medium for the refrigerant used in cooling the air.

3,991,590

SAFETY OVERLOAD CLUTCH

John H. Brems, Birmingham; Neil J. Stalker, and Peter H. Ohrnberger, both of Clarkston, all of Mich., assignors to F. Jos. Lamb Company, Warren, Mich.

Continuation of Ser. No. 466,961, May 6, 1974, abandoned. This application Feb. 24, 1975, Ser. No. 552,764
Int. Cl.² F16D 3/56, 7/00
U.S. Cl. 64—29 13 Claims

1. An overload clutch permitting only a single angular driving relationship between the driving and driven elements thereof comprising:

a. a rotary driving member;

b. a rotary driven member coaxial with the driving member;

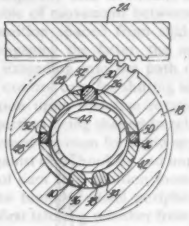
c. one of said members having a circular cylindrical bearing surface interrupted only by a single longitudinally extending groove therein, the other of said members being provided with a single primary slot extending longitudinally

thereof and with longitudinally extending secondary slot means disposed substantially diametrically opposite said primary slot;

d. a primary drive roller in said primary slot and seated in said groove when the clutch is driving;

e. a secondary roller means in said secondary slot means;

f. circumferentially continuous elastic ring means of substantially constant cross section and of substantially circular shape when relaxed, said ring means loading said



primary roller into said longitudinal groove and being reacted by the secondary roller means to deflect the ring means into oval shape so that the diameter thereof in one direction is reduced and its diameter in a direction perpendicular thereto is increased; and

g. means for preventing the secondary roller means from seating in the primary slot in a loaded condition by said ring means in response to relative rotation between the driving and driven members.

3,991,591

PATTERN DRUM FOR CIRCULAR KNITTING MACHINES

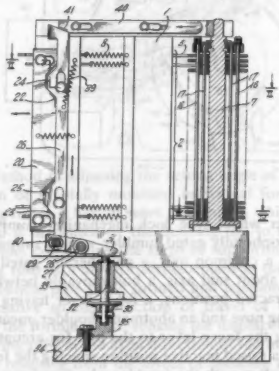
Dietrich Cotte, Karl-Marx-Stadt; Holger Scheffler, Lichtenstein, and Claus Kertzscher, Zschopau, all of Germany, assignors to VEB Wirkmaschinenbau Karl-Marx-Stadt, Germany

Continuation-in-part of Ser. No. 344,656, March 26, 1973, Pat. No. 3,911,697. This application July 7, 1975, Ser. No. 593,823

The portion of the term of this patent subsequent to Oct. 14, 1992, has been disclaimed.

Int. Cl.² D04B *15/74*

U.S. Cl. 66—50 B **2 Claims**



1. A circular knitting machine comprising a cylindrical pattern drum comprising disk means supporting a plurality of radially spaced cams each mounted for pivotal movement about an axis parallel to but offset from the drum axis, said cams being movable about their pivotal axes between a first and a second position, the angular movement between those positions being less than 90°, a plurality of said disk means arranged in a stack, a plurality of locking elements each associated with a plurality of radially aligned ones of said cams of said disk means and operable to secure the associated cams in selected ones of said positions, said cams cooperating with selector elements associated with stitch-forming means and means for disengaging the selectors from the cams, each of said locking elements passing through a cam to secure it in the said first position and holding others of the cams with which it is associated against a fixed abutment to secure it in the second position, said locking means being common to radially aligned ones of said cams in said stacks.

3,991,592

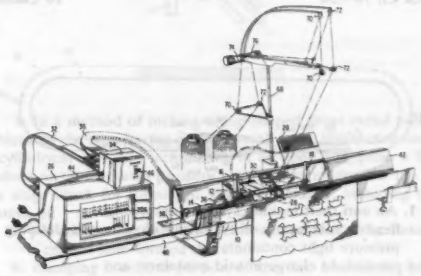
AUTOMATED HOME KNITTING MACHINE

William Kahan, New York, N.Y.; Fredrick Alexander Rupinski, Lyndhurst, Barney Dean Hunts, Mountain Lakes, Howard David Rogers, Fanwood, all of N.J.; John Francis Wagner, Garden City, N.Y., and John Vernon Landau, Jr., Mt. Lakes, N.J., assignors to The Singer Company, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,446

Int. Cl.² D04B *7/00*

U.S. Cl. 66—75 A **18 Claims**



1. In a programmable knitting machine the combination comprising a needle bed supporting a plurality of needles in side by side relation, a carriage mounted on the bed for movement traversing the needles, a program card, a card reader for reading design defining instructions on the card, switch means, electronic control means responsive to the card reader and switch means for controlling the knitting of fabric on the machine, and a mode switch for placing the electronic control means in a program mode or a knit mode, the said switch means including one or more switches operable during at least one such mode for prescribing design instructions other than instructions prescribable on the card.

3,991,593

WARP KNITTING MACHINE

Georg Bernert, Kirschau; Josef Kumpfel, Schland, Spree; Manfred Schneider, Karl-Marx-Stadt, and Wolfgang Vogel, Jahnsdorf, all of Germany, assignors to VEB Wirkmaschinenbau Karl-Marx-Stadt, Karl-Marx-Stadt, Germany

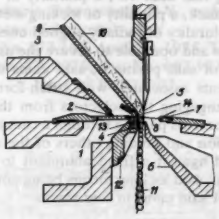
Filed July 11, 1975, Ser. No. 594,996

Int. Cl.² D04B *23/06*

U.S. Cl. 66—85 A **7 Claims**

1. In a warp knitting machine comprising a row of reciprocable needles having hooks, knock-over means and counter means spaced from the knock-over means so arranged that the reciprocation of the needles traverses the respective knock-over means and counter means, means for feeding a non-woven fabric between the knock-over means and the counter means, and means for opening and closing the hooks of the

needles, the improvement comprising means having boundaries defining a recess extending continuously in the direction



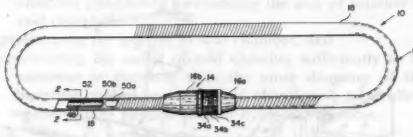
of the row of needles in the path of each of the needles and constituting means for receiving bulged fabric therebetween as the needles are withdrawn from the fabric.

3,991,594

ANTI THEFT LOCKING SYSTEM

Albert O. Goenner, 9300 Old Georgetown Road, Bethesda, Md. 20014

Filed Dec. 27, 1974, Ser. No. 536,855
Int. Cl.² E05B *37/06*
U.S. Cl. 70—30 **10 Claims**



1. An anti theft locking system comprising:
a flexible tubular member having closed ends defining a pressure tight container;
a pressurized charge in said container; and
locking means comprising tubular, nesting male and female components, each having walls defining coaxial bores therethrough associated with said member and receiving said container completely therethrough for providing locking interconnection of the ends thereof.

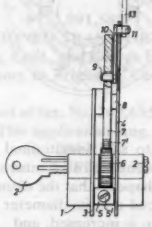
3,991,595

LOCKING ARRANGEMENT FOR DOORS AND THE LIKE

Abraham Bahry, and Moshe Dolev, both of 41 Geulim St., Holon, Israel

Filed Sept. 30, 1974, Ser. No. 510,405
Int. Cl.² E05B *63/14*; E05C *1/06*, *9/06*, *9/16*
U.S. Cl. 70—120 **7 Claims**

1. A locking arrangement for doors and the like,
said arrangement comprising a door and jamb arrangement,
at least one elongated bolt adapted for springless extension and retraction,
said door being locked when said locking bolt is extended into said jamb and unlocked when said bolt is retracted,
key operated locking means for operation by a key,
a pair of spaced apart parallel plates,
each of said plates being attached to and being substantially normal to the longitudinal axis of said locking means,
pinion gear means mounted between said parallel plates for rotational movement responsive to the operation of said locking means,
an operating gear wheel being pivotally mounted between said parallel plates positioned to mesh with said pinion gear means to rotate responsive to the rotation of said pinion gear means,
link means having one end pivotally attached to a fixed point on said operating gear wheel and removed from the center thereof,
slot means in one of said pair of parallel plates,
said slot means being radial relative to the center of said operating gear wheel and starting at a point on said one of said pair of parallel plates that is adjacent a point on the operating gear wheel between the center of the wheel and the outer circumference of the wheel and extending toward the outer circumference, and



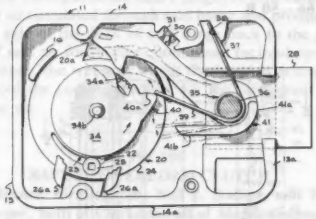
pin means extending through said radially extending slot for pivotally attaching a fixed point on said at least one elongated locking bolt external to said pair of parallel plates to a fixed point on the other end of said link means for translating the rotational movement of said operating gear wheel into a linear movement of said one of said locking bolts for the extension and retraction thereof responsive to the rotation of said operating gear wheel.

3,991,596

TUMBLER WHEEL, CHANGEABLE COMBINATION KEY LOCK CONSTRUCTION

Klaus W. Gartner, Downey, Calif., assignor to Sargent & Greenleaf, Inc., Nicholasville, Ky.

Filed Jan. 30, 1976, Ser. No. 653,890
Int. Cl.² E05B *37/08*
U.S. Cl. 70—303 A **14 Claims**



1. A tumbler wheel type lock mechanism comprising a plurality of peripherally gated tumbler wheels supported for rotation about a common axis, a peripherally gated control cam rotatable about said axis, a bolt movable between projected and retracted positions, a fence lever having a fence and a depending nose and an abutment shoulder, means pivotally connecting the fence lever to the bolt for arcuate movement between a raised inactive position spacing the fence and nose out of contact with the tumbler wheel and control cam peripheries and a lowered active position locating the fence and nose in said gates, the control cam being operatively coupled to said nose at said active position for retracting the

bolt upon predetermined rotation of the control cam, manually operable means for adjusting the angular positions of the tumbler wheels, coactive latching members for releasably latching said fence lever in said raised inactive position including a first latching member on the fence lever and a second latching member in the form of a stationary resilient latching element located at a fixed position above the fence lever to receive and releasably capture said first latching member and thereby hold the fence lever at said raised inactive position, a releasing spring adjacent said abutment shoulder having a movable leg capable of movement between a stressed spring energy storage position spaced from said shoulder and an impact position engaging the latter, the movable spring leg having a portion extending into the path of movement of a projection on the control cam for shifting said movable leg to the stressed position upon selective rotation of the control cam and said projection being shaped to release said movable leg from such stressed position for rapid spring driven movement to impact against said shoulder and impel the fonce lever toward the control cam to a position momentarily engaging the fence with the tumbler wheel peripheries without fully withdrawing said first latching member from the second latching member, the second latching member being operative to return the fence lever to said raised inactive position when the tumbler wheel gates are not aligned with the fence following the momentary engagement with a misaligned tumbler wheel periphery and the latching members being decoupled from each other to release the fence lever to said lowered active position responsive to such impelling of the fence lever toward the control cam when the tumbler wheel gates are properly aligned with the fence.

3,991,597

METHOD AND DEVICE FOR ADJUSTING FORMING ROLLS IN A HELICAL SEAM PIPE MILL

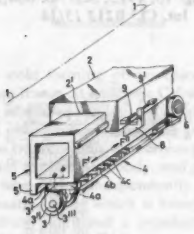
Heinz Krakow, Hamburg, Germany, assignor to Blohm & Voss AG, Hamburg-Steinwerder, Germany

Filed Dec. 10, 1974, Ser. No. 531,440

Claims priority, application Germany, Dec. 13, 1973, 2361992

Int. Cl.² B21B *37/04, 37/08*

U.S. Cl. 72—12 **4 Claims**



1. Method of adjusting the setting angle of the direction of rotation of pivotally mounted individual forming rolls of a bending roll in a helical seam pipe mill in which a metal plate or band is deformed by the bending roll to form the helical seam pipe, comprising the steps of supporting the individual forming rolls as a unit for displacement in the axial direction of the helical pipe being formed and positioning the forming rolls relative to the direction of travel of the metal plate toward the forming rolls, sensing the displacement of the unit of forming rolls in the axial direction of the helical pipe being formed resulting from the effect of shearing forces acting on the rolls as a result of a change in direction of the travel of the metal plate, and adjusting the setting angle in accordance with the extent of the displacement of the unit of the forming rolls in the axial direction of the helical pipe being formed so that the presence of the sheering forces acting on the forming rolls is avoided.

3,991,598

METHOD OF ROLLER SPINNING CUP-SHAPED METAL BLANKS

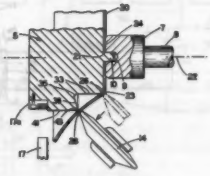
Derald H. Kraft, Canton, Ohio, assignor to Aspro, Incorporated, Canton, Ohio

Filed June 6, 1975, Ser. No. 584,388

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.² B21D *22/14, 29/02*

U.S. Cl. 72—83 **10 Claims**



1. In a method of making a cup-shaped sheet metal pulley blank of the type having a bottom wall and a connected outer cylindrical side wall terminating in an open end, from a flat sheet metal disc with pressure roll forming means, for use as a stage blank for forming a V-grooved pulley, including the steps of:

a. providing a flat uniform thickness sheet metal disc having a central hole formed therein;

b. clamping a central portion of the disc around the hole between opposed relatively axially movable complementary clamping faces of rotatable headstock and tailstock die means wherein the headstock die means also has cylindrical flange-forming means and reentrant conical flange forming means connected with the cylindrical flange forming means by a reentrant corner acutely angled in cross section;

c. rotating the die means and clamped disc;

d. reforming the disc into a cup-shaped blank having a flat bottom wall and a connected annular reversely angled conical flange portion terminating in an axially extending open-ended cylindrical side wall portion by pressure rolling, forming and ironing the rotating annular disc metal portions surrounding said central portion against the headstock die means cylindrical and conical flange forming means and the connected reentrant corner;

e. said reforming step including forming a reentrant corner, acutely angled in cross section, connecting said reversely angled conical flange and said axially extending side wall portion;

f. maintaining the thickness of the disc metal during reforming throughout the conical flange portion, the reentrant corner and cylindrical wall portions substantially unchanged from that of the sheet metal disc to provide a cup-shaped blank having substantially uniform thickness conical flange portion, reentrant corner and cylindrical side wall portion; and

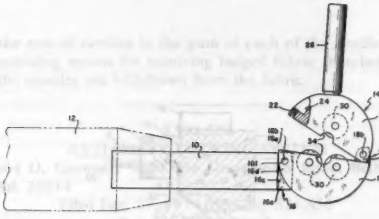
g. then while continuing rotation of the die means and clamped blank, trimming the open end of the cylindrical side wall to predetermined axial length with respect to the acutely angled reentrant corner.

3,991,599

RIB FORMING TOOL FOR TUBING

James P. Rowley, Downers Grove; Edward F. Lewandowski, Westmont, and Edward F. Groh, Naperville, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 2, 1975, Ser. No. 636,883
Int. Cl.[2] B21D *3/02*, *17/04*
U.S. Cl. 72—121 2 Claims



1. A rib forming tool comprising:

a tool holding bar;

a tool head having two complementary tool head parts with a first tool head part hinged to the tool bar, whereby the tool bar permits limited pivotal motion of the first tool head part with respect to said tool bar and the second tool head part is hinged to the first tool head part, whereby the second part may achieve limited pivotal motion with respect to the first part;

two rollers located in the first tool head part and rotatably retained by axles parallel to the longitudinal axis of the tubular workpiece and located equidistantly from the center of the tool head on radii 120° apart, each roller having a thin flange located in a single forming plane normal to the longitudinal axis of the workpiece;

a third roller similarly located in the second tool head part and similarly rotatably retained by an axle on a radius 120° from each of said axle radii in the first part, the third roller having a thin flange disposed in the single forming plane;

an adjustable screw means located in the second tool head part and penetrating through a facing surface of the second part between the center of the tool head and the circumference of the second part nearest the tool bar against the tool bar, whereby the degree of closure between the two complementary tool head parts may be controlled, thus regulating the depth of the rib formed in a tubular workpiece,

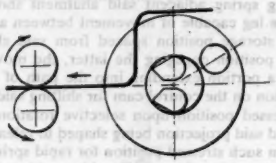
the tool head having a hole exposing an equal portion of each of the three roller flanges in the single forming plane and of a diameter at least equal to that of the largest workpiece to be formed, whereby the tubular workpiece may be passed through the hole, supported on either end in a lathe while the second tool head part is raised away from the first tool tool head part and the first part is pivoted slightly with respect to the tool bar so that upon rotation of the tubular workpiece by the lathe, the the second tool head part may be brought into contact with workpiece by the handle thus simultaneously raising the first tool head part by means of the hinges and bringing the three roller flanges into contact with the tubular workpiece in the single forming plane, thereby exerting a pressure on the tubular workpiece and forming a circumferential internal rib in the tubular workpiece.

3,991,600

STIRRUP MACHINE

Remigio Del Fabro, Villaggio Morena n. 62, Reana Del Roiale, Udine, Italy (33010)

Filed July 18, 1975, Ser. No. 597,372
Claims priority, application Italy, Nov. 15, 1974, 83429/74
Int. Cl.[2] B21D *7/08*
U.S. Cl. 72—203 5 Claims



1. A stirrup machine for bending of stock material such as bars, wires, metal strips or the like and forming individual, bent pieces therefrom, the machine comprising:

advancing and reversing means for selectively advancing feed of the stock material which is to be bent and reversing feed of the stock material which has been bent;

support means for supporting the stock material to be bent;

first operating means connected to said support means for enabling said support means to be moved forward or backward with respect to the stock material;

bending means mounted on said support means for bending the stock material, said bending means being connected to said first operating means and being movable with said support means; and

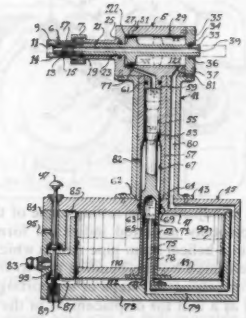
shearing means mounted between said advancing and reversing means and said bending means for shearing the stock material at a desired location subsequent to bending and reversal thereof.

3,991,601

FLUID ACTUATED RECIPROCATING TOOL

Samuel G. Duncan, 2227-60th Ave. SE. Mercer Island, Wash. 98040

Filed Aug. 13, 1975, Ser. No. 604,255
Int. Cl.[2] B21J *15/34*
U.S. Cl. 72—391 8 Claims



1. A tool for installing swage locking pins and collars including a swaging and installing means having swaging means for forming the collar comprising in combination:

a. A pneumatic system including a pneumatic piston for driving a driving piston when activated in one direction and for driving a hollow cylinder when activated in opposite direction,

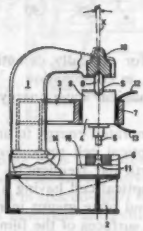
b. said driving piston being part of a first hydraulic system,
c. said hollow cylinder being part of a second hydraulic system,
d. a working piston and rod assembly adapted to move one way by positive hydraulic liquid pressure of said first hydraulic system caused by said driving piston when driven and said assembly adapted to move the opposite way by positive hydraulic liquid pressure of said second hydraulic system caused by said hollow cylinder when driven,
e. said swaging and installing means for swaging a said associated collar about a said associated to be installed pin, actuated by said working piston and rod assembly whereby said swaging and installing operation occurs when said driving piston is driven and whereby after said associated swaged collar is ejected said swaging and installing means is repositioned when said hollow cylinder is driven for a next swaging and installing operation.

3,991,602

PRESS FOR COLD FORMING OF WORKPIECES FROM A METAL SHEET

Siegfried Harcuba, Saarbrucken, and Herbert Dits, Schmelz, both of Germany, assignors to Siegfreid Harcuba, Saarbrucken, Germany

Filed July 8, 1975, Ser. No. 594,014
Claims priority, application Switzerland, July 9, 1974, 9438/74
Int. Cl.² B21J *13/04*
U.S. Cl. 72—455 **4 Claims**



1. A press for cold forming of workpieces from a metal sheet having a base frame, at least one C-frame, an upper and a lower tool, one of said upper tool and said lower tool being connected with a piston actuated by pressure means, characterized by a guide frame which is bodily separated from said C-frame and carries a cylindrical body, said guide frame being attached to said base frame independently of said C-frame, and by a compensating body which is loosely positioned between said cylindrical body and a crossbar connecting said upper arms of said C-frames, said compensating body being coaxial with said upper and lower tools and swingable in the plane running perpendicularly to the plane of said guide frame by an angle α from the vertical axis passing through said upper and lower tools.

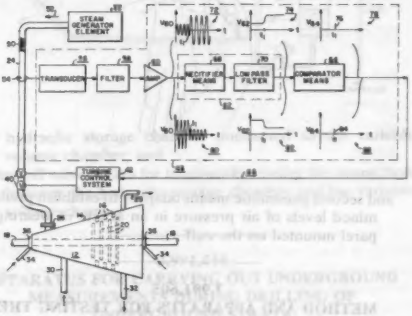
3,991,603

MOISTURE INDICATING APPARATUS

James W. Wonn, Irwin, and Ronald L. Bannister, Glen Mills, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1975, Ser. No. 557,153
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² G01N *29/02*
U.S. Cl. 73—29 **4 Claims**

1. A steam turbine comprising:
a casing having rotating and stationary blades therein,
conduit means for conducting an elastic fluid vapor into and out of said casing and,
first means for detecting sonic energy produced within the conduit by the moisture, the first means being mounted on said conduit at a first predetermined location,
second means for detecting sonic energy variations produced within the conduit by the moisture, said second means being mounted on said conduit at a predetermined location spaced a predetermined distance from said first predetermined location,
means for converting the sonic energy detected by said first and said second detecting means into a first and a second electrical signal,



means for comparing the magnitude of each of said electrical signals with a predetermined magnitude and for generating a signal indicating that both electrical signals differ in magnitude from said predetermined magnitude,
means for determining the time difference between said first and said second electrical signals, and for comparing said time difference with a predetermined time value, and for generating a signal indicating the time difference between said first and said second electrical signals substantially equal said predetermined time value, and means responsive to said signals generated by said magnitude-comparing means and said time-comparing means for indicating the presence and amount of moisture droplets within said vapor flow.

3,991,604

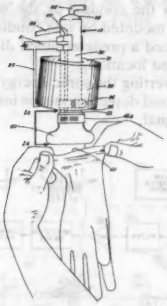
WORK FIXTURE AND TESTING METHOD

Robert L. Hayes, and Joseph C. Gould, both of, Honea Path, S.C., assignors to Parke, Davis & Company, Detroit, Mich.

Filed June 9, 1975, Ser. No. 585,271
Int. Cl.² C01M *3/02*
U.S. Cl. 73—37 **6 Claims**

1. In a hollow work fixture or mount for suspending by gravity, pressure-testing, and demounting an article of leak-proof wearing apparel, the demounting being accomplished by threading the suspended article upwardly into the hollow fixture, the combination comprising:
a sleeve member having a downwardly disposed cuff defining an open end, said cuff being hollow and adapted for mounting thereon in downwardly suspended relation or demounting therefrom an article of wearing apparel, the open end of the cuff being sufficiently large to permit insertion of said article of wearing apparel of a portion thereof into the cuff to accomplish said demounting,
a collar in surrounding concentric relation with said cuff, the collar being axially retractable to expose said cuff for mounting, at least one of said collar and cuff being adapted to be inflated by pneumatic means to a first position for test purposes and deflated to a second position, said collar and cuff being further adapted in the first

position to pneumatically clamp therebetween an article of wearing apparel mounted on the cuff and being annularly spaced in the second position for said mounting and demounting,



and second pneumatic means adapted to establish predetermined levels of air pressure in an article of wearing apparel mounted on the cuff.

3,991,605

METHOD AND APPARATUS FOR TESTING THE WRAPPERS OF CIGARETTES AND THE LIKE

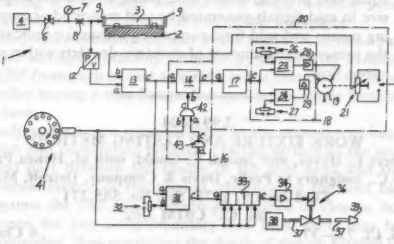
Joachim Reuland, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed July 17, 1975, Ser. No. 596,904

Claims priority, application Germany, July 19, 1974, 2434736

Int. Cl.² G01M *3/26*

U.S. Cl. 73—38 **25 Claims**



1. A method of testing the wrappers of a plurality of cigarettes, cigars, cigarillos, cigarette filters, other rod-shaped smokers' articles, and the like, comprising the steps of generating for each article a first signal indicative of the gas permeability of the wrapper of the article; generating a second signal indicative of the porosity of the material of the wrappers of the articles, processing the first and second signals to form for each article a third signal indicative, to an extent greater than the respective first signal, of the component of the gas permeability of the wrapper of the article not attributable to the porosity of the material of the wrapper; and comparing the third signal to a reference signal to determine whether the wrapper of the tested article is defective, wherein said step of generating said second signal comprises generating said second signal by averaging out the gas permeabilities of the wrappers of a number of such articles.

3,991,606

APPARATUS AND METHOD FOR CONVERTING MECHANICAL WAVE ENERGY TO OPTICAL ENERGY

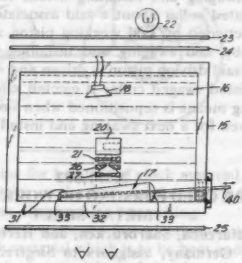
John F. Dreyer, Cincinnati, Ohio, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

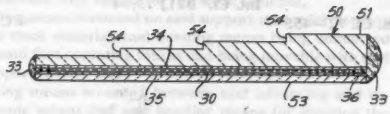
Filed Nov. 8, 1974, Ser. No. 522,309

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G01N *9/24*; G02F *1/13*

U.S. Cl. 73—67.5 H **15 Claims**





10. A method for optically detecting a pattern of wave energy comprising, in combination:

generating mechanical wave energy of particular frequencies;

directing the generated energy to an object under test and then to an optical cell responsive to mechanical wave energy of particular frequencies to produce an optical pattern, the optical cell having a liquid crystal film and first and second plate means in respective juxtaposition with opposite surfaces of the film;

varying the frequency response of the optical cell at successive portions thereof by varying the thickness of at least one of the plate means which is positioned between the wave energy generating means and said liquid crystal film and is formed with successive portions being responsive to different applied frequencies; and

detecting the optical pattern resulting from the application of mechanical wave energy to selected ones of said portions;

3,991,607

HIGH RESOLUTION PULSE-ECHO ULTRASONIC METHOD AND APPARATUS

Ludwig Niklas, Lovenich, Germany, assignor to Krautkramer-Branson, Incorporated, Stratford, Conn.

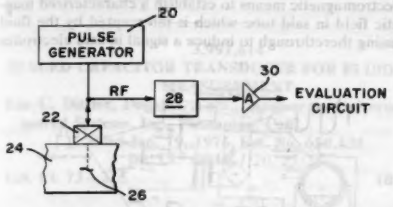
Filed Sept. 8, 1975, Ser. No. 611,232

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.7 **23 Claims**

1. The method of evaluating in a pulse-echo ultrasonic arrangement an acoustic discontinuity responsive echo signal comprising: receiving an acoustic discontinuity responsive echo signal and converting said echo signal to an electrical signal, and processing said electrical signal by electronically performing a mathematical convolution of said electrical signal with a predetermined signal, said predetermined signal being selected such that the mathematical product of the Laplace transform of said electrical signal and of said prede-

termined signal equals unity, for providing a signal having a duration beginning substantially with the receipt of said electrical signal and terminating prior to the natural decay of said electrical signal.

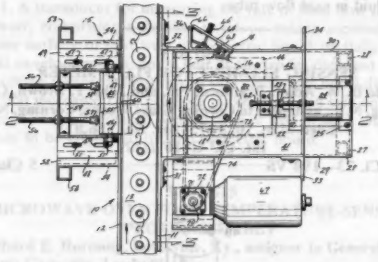


3,991,608

IMPACT SIMULATOR METHOD AND APPARATUS

James T. McGuire; Charles R. Plummer, and Peter P. Rudowsky, all of Bridgeton, N.J., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 26, 1970, Ser. No. 83,974
Int. Cl.² G01N *3/08*
U.S. Cl. 73—94 **2 Claims**



1. Apparatus for testing glass containers for structural defects comprising, conveyor means for moving containers in an upright position in series in spaced-apart relationship, endless bottle-engaging means mounted adjacent said conveyor for movement in a vertical plane parallel to the direction of movement of said conveyor, means for continuously moving said bottle-engaging means at a preselected velocity, said bottle-engaging means having a substantial vertical height with a portion of said bottle-engaging means extendng over a portion of said conveyor, an elongated pressure plate mounted in opposing relationship to that portion of said bottle-engaging means extending over the conveyor, means for mounting said pressure plate for slight pivotal movement about a horizontal axis, parallel to said conveyor, force applying means for biasing said bottle-engaging means and said pressure plate toward each other whereby containers moving along said conveyor are engaged between said bottle-engaging means and pressure plate to thereby be stressed.

3,991,609

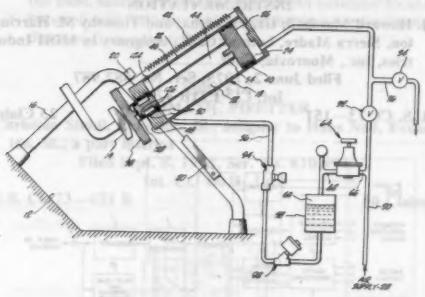
BRAKE TESTING APPARATUS AND METHOD INCORPORATING HYDRAULIC POSITION-SENSITIVE SUBSYSTEM

Carl Junior Asmus, and Woodrow Christman Wickersham, both of Los Angeles, Calif., assignors to Clayton Manufacturing Company, El Monte, Calif.

Filed Mar. 31, 1975, Ser. No. 563,329
Int. Cl.² G01L *5/28*
U.S. Cl. 73—132 **14 Claims**

1. In a brake testing mechanism having an actuator for moving a brake applying member until a desired amount of brake actuation has occurred, a hydraulic subsystem which comprises:

a variable volume chamber which reduces in volume as the actuator moves the brake applying member in the brake-applying direction;



a hydraulic storage chamber connected to the variable volume chamber; and

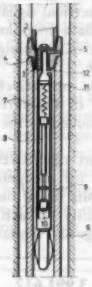
shut-off valve means for temporarily closing the connection between the hydraulic storage chamber and the variable volume chamber.

3,991,610

APPARATUS FOR CARRYING OUT UNDERGROUND MEASUREMENTS DURING DRILLING OF UNDERGROUND STRATA

Geza Rakar; Zoltan Toth, and Istvan Zsoka, all of Budapest, Hungary, assignors to Koolaj-Es Foldgazbanyaszati Ipari Kutato Laboratorium, Budapest, Hungary

Filed Nov. 6, 1975, Ser. No. 629,634
Claims priority, application Hungary, Nov. 8, 1974, KO 2686
Int. Cl.² E21B *47/00*
U.S. Cl. 73—151 **6 Claims**



1. Apparatus for performing underground measurements during drilling of underground strata using conventional measuring instruments, comprising a closed instrument casing which in use is filled with a hydraulic fluid, an adaptor operable for coupling said casing to the drilling pipe, a spring holder connected to the instrument casing and carrying damping spring means, a member operative for controlling angular displacement and a hydraulic displacement control device, a first bore in the adaptor for permitting mud to flow downwardly around the outside of said casing, a second, closable bore in the adaptor for permitting mud to flow through said casing, a third closable bore in the said casing for communicating external pressure to the interior of the said casing, and

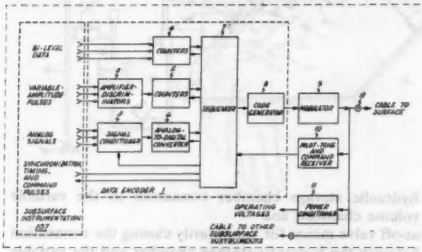
means operable for opening and closing said second and third bores in mutually opposite senses.

3,991,611

DIGITAL TELEMETERING SYSTEM FOR SUBSURFACE INSTRUMENTATION

J. Howard Marshall, III, Pasadena, and Timothy M. Harrington, Sierra Madre, both of Calif., assignors to MDH Industries, Inc., Monrovia, Calif.

Filed June 2, 1975, Ser. No. 582,987
Int. Cl.[2] E21B *47/00*
U.S. Cl. 73—151 **23 Claims**



BLOCK DIAGRAM OF ONE CHANNEL OF A DIGITAL TELEMETERING SYSTEM

1. For use in combination with subsurface instrumentation having at least one information source placed in a borehole and connected to the surface by a cable, an improved digital telemetering system for transmitting data therefrom to the vicinity of the surface, said information source producing data corresponding to and representative of the value of at least one parameter describing the subsurface environment, the improved system comprising:

a. data-encoding means operatively associated with the subsurface instrumentation for generating digital data representing the value of at least one measured parameter and for arranging the position of the individual data bits in a sequence of a multiplicity of such bits so that each bit bears a known relationship of a specific parameter;

b. modulating means operatively associated with the data-encoding means and the cable to the vicinity of the surface for providing electrical signals representative of the digital data from the data-encoding means, said electrical signals being capable of traveling over the cable to the vicinity of the surface;

c. demodulating means operatively associated with the cable in the vicinity of the surface for converting the electrical signals produced by the modulating means into digital data; and

d. data-decoding means operatively associated with the demodulating means for recognizing the significance of the individual data bits based on their position in a sequence of a multiplicity of such bits and for using this information to arrange the digital data in a useful form.

3,991,612

ELECTROMAGNETIC FLOWMETER USABLE IN LESS-THAN FULL FLUID LINES

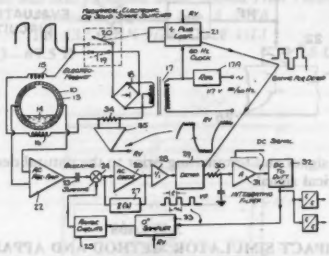
Elmer D. Mannherz, Southampton, and John S. Yard, Doylestown, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Oct. 14, 1975, Ser. No. 622,063
Int. Cl.[2] G01F *1/58*
U.S. Cl. 73—194 EM **5 Claims**

1. An electromagnetic flowmeter for accurately measuring the flow rate of fluid in a fluid line which is normally less-than-full, said flowmeter comprising:

A. a flow tube interposable in said line and provided with a pair of arcuate electrodes which span a substantial portion of the total circumference of the tube to render the electrodes operative with respect to the fluid passing through the tube in a fluid level range whose lowest point is a level close to empty, and

B. electromagnetic means to establish a characterized magnetic field in said tube which is intercepted by the fluid passing therethrough to induce a signal in said electrodes



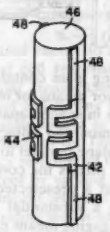
as a function of flow rate, said field having an intensity which is greatest at the top of said tube and diminishes as one approaches the bottom thereof to an extent rendering the amplitude of said signal proportional to volumetric flow rate and substantially independent of the level of fluid in said flow tube.

3,991,613

SENSING ELEMENT FOR FLOW METER

Meryle D. W. Adler, Bradford, Pa., and John T. Brown, Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 10, 1975, Ser. No. 556,811
Int. Cl.[2] G01F *1/32*
U.S. Cl. 73—194 VS **5 Claims**



1. Flow metering apparatus comprising

means defining a chamber which is adapted to conduct fluid in the direction of the longitudinal axis thereof,

an elongated cylindrically shaped substrate extending between opposed surfaces of said chamber defining means transverse to said longitudinal axis, said substrate having a nonconductive surface,

a pair of thin resistive films symmetrically disposed on opposite sides of the upstream surface of said substrate and extending substantially the entire distance between said opposed surfaces of said chamber defining means, said films having thicknesses less than 10,000 A, having a resistivity that varies with temperature, and comprising a first coating of an adherent electroconductive metallic oxide disposed on the surface of said substrate and a second coating of metal disposed on said first coating,

means connected to opposite ends of said films for causing a current to flow therethrough that is sufficient to heat said films, and

means for detecting the periodic changes in resistance of said films as vortices generated by the fluid flowing past

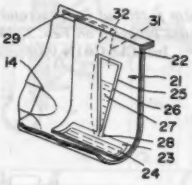
said substrate cause differential cooling of said films and for providing an electrical output indicative of the velocity of said fluid stream.

3,991,614

SEALED CAPACITOR TRANSDUCER FOR FLUID FLOW MEASUREMENT

Lee C. Ditzler, Danville, Calif., assignor to Universal Engineered Systems, Inc., Pleasanton, Calif.

Filed Jan. 19, 1976, Ser. No. 650,435
Int. Cl.² G01F *1/20, 23/26*
U.S. Cl. 73—215 **10 Claims**



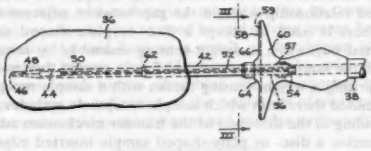
1. A transducer for measuring the rate of fluid flow through a weir, comprising a flexible envelope means secured to an inner surface of said weir, a dielectric liquid partially filling said envelope means, and a pair of electrodes disposed in said envelope means, at least one of said electrodes being disposed so that increased fluid pressure impinging upon said envelope means causes increased surface area of said at least one electrode to be contacted by said dielectric liquid.

3,991,615

MICROWAVE OVEN FOOD TEMPERATURE-SENSING PROBE ASSEMBLY

Richard E. Hornung, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 643,109
Int. Cl.² G01K *1/08, 7/24;* **H05B** *9/06*
U.S. Cl. 73—352 **8 Claims**



1. A temperature-sensing probe assembly for monitoring the internal temperature of food being cooked in the cooking cavity of a microwave oven, said probe assembly comprising:

a. a probe adapted for insertion into food to be cooked, said probe including an elongated conductive housing, the tip end of which is closed and shaped to facilitate insertion into the food, and said probe further including a temperature-sensing electrical element positioned internally of the housing near the tip end;

b. a flexible shielded cable for connecting said electrical element to circuitry responsive to thermally-induced changes in a characteristic of said electrical element, the cable shield being electrically connected at one end to the connection end of said probe housing and adapted at the other end for connection to a wall of the cooking cavity, said probe housing and the cable shield thereby cooperating to form a continuous conductive sheath from the tip of said probe housing to the other end of said cable;

c. an electrically-conductive reflector mounted at a fixed position on said conductive sheath a predetermined distance from the tip end of said probe housing; and

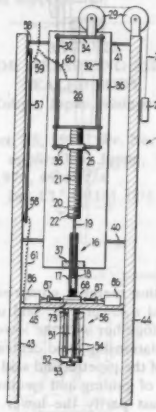
d. an indicator on said probe housing to show the minimum recommended insertion depth of said probe housing into the food, said minimum insertion depth indicator located between said reflector and the probe tip a predetermined distance from said reflector.

3,991,616

AUTOMATIC PIPETTER

Christian Stahli, Evanston, Ill., assignor to Hans Noll, Evanston, Ill., a part interest

Filed Sept. 8, 1975, Ser. No. 610,997
Int. Cl.² B01L *3/02*
U.S. Cl. 73—421 R **50 Claims**



1. A pipetter comprising:

A. containing means for holding a fluid to be measured; and

B. Measuring means, in fluid communication with said containing means, for placing one of a plurality of predetermined amounts of fluid into said containing means and moving fluid from within to outside of said containing means,

said containing means including at least first and second openings permitting, when said measuring means place fluid into said containing means, the passage of fluid into said containing means without contacting said measuring means, said containing and said measuring means permitting substantially all of the fluid placed in said containing means through said first opening to move outside of said containing means through another opening without substantial dilution by any other fluid.

3,991,617

DEVICE FOR EJECTING THE REMOVABLE TIP OF A PIPETTE

Eric J. H. Marteau d'Autry, 69-72 rue Gambetta Villiers Le Bel, 95 Arnouville les Gonesse, France

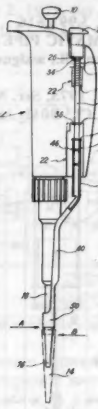
Filed Oct. 14, 1975, Ser. No. 622,317
Claims priority, application France, Oct. 15, 1974, 74.34588
Int. Cl.² B01L *3/02*
U.S. Cl. 73—425.4 P **10 Claims**

1. Device for ejecting the removable tip of a pipette, the lower end of which terminates in the form of a conical part intended to receive said removable tip by friction, in particular of a micro-pipette, characterised by the fact it comprises in combination:

a rod which is incorporated in a passage provided in the body of the pipette, said passage and said rod being arranged so as to be able to impart to the latter a movement of translation parallel to the axis of the pipette;

means allowing said rod to move along a certain path limited in the upwards and downwards direction;

resilient means permanently urging said rod in an upwards direction;



a removable ejection member comprising an upper part, a central part and a lower end, said upper part being removably fitted together with the lower part of said rod in an abutment relationship, said central part being located in the vicinity of the pipette, and said lower end terminating in the form of guiding and ejection means in order to surround at least partly the lower tubular end of the pipette in the vicinity of its conical part, the lower end of said ejection member in its upper position not reaching the upper limit of the removable tip when the latter is put in position by friction.

3,991,618

SENSOR FOR AUTOMATIC STEERING SYSTEM FOR ROW-CROP HARVESTER

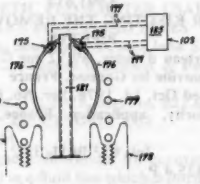
Michael Stampfer, Gottmadingen; Ewald Graeber, Weiterdingen; Helmut Oni, Gottmadingen, and Ernst Ruede, Bietingen, all of Germany, assignors to Maschinenfabrik Fahr Aktiengesellschaft, Gottmadingen, Germany

Division of Ser. No. 532,859, Dec. 16, 1974, Pat. No. 3,952,825. This application Nov. 5, 1975, Ser. No. 629,148

Claims priority, application Germany, Dec. 18, 1973, 2362899; Jan. 3, 1974, 2400125

Int. Cl.² A01D *35/14*

U.S. Cl. 73—432 R **4 Claims**



1. A sensor for an automatic steering system of a standing-crop harvester having a chassis adapted to travel in a transport direction along the ground, said sensor comprising:

a support on said chassis;

a flexible and arcuate rod having one end secured to said support and another end extending horizontally backwardly in said direction toward said chassis; and

a strain gauge bonded to said rod adjacent said one end.

3,991,619

APPARATUS FOR MEASURING SPECIFIC GRAVITY

David Dale Appleford, Swindon, England, and David Philip King, Akron, Ohio, assignors to Monsanto Chemicals Limited, London, England

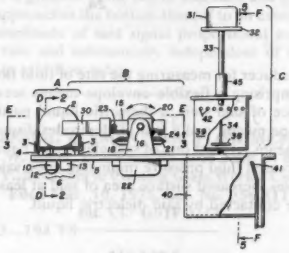
Filed Nov. 29, 1974, Ser. No. 528,401

Claims priority, application United Kingdom, Nov. 28, 1973, 55075/73

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G01N *9/08*

U.S. Cl. 73—437 **6 Claims**

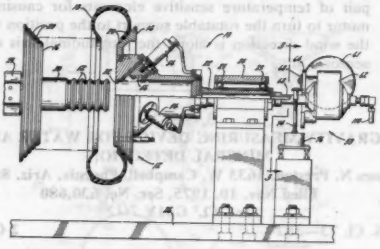


1. Apparatus for determining the specific gravity of each of a plurality of disc- or plate-shaped samples of a solid water-insoluble material, the apparatus comprising a rack movable in its longitudinal direction and having a plurality of transverse space members for accommodating samples in mutually spaced relationship wherein the gap between adjacent space members is sized to accept a disc- or plate-shaped sample inserted edgeways, a weight-sensing assembly by means of which the sample can be weighed first in air and then in water comprising a weight-sensing means with a sample receptacle suspended therefrom which sample receptacle includes a slot extending in the direction of the transfer mechanism adapted to receive a disc- or plate-shaped sample inserted edgeways and a reservoir operable between an upper position in which it surrounds the lower end of the sample receptacle and a lower position, and a transfer mechanism for transferring the samples, one at a time, from the rack to the weight-sensing assembly and returning each sample to the rack after the weighings on that sample are completed, comprising an arm having gripping means at one end which arm is pivoted to swing about an axis spaced from said end and pivots in a plane between the rack and the sample receptacle of the weight-sensing assembly, and wherein the transfer mechanism and the weight-sensing assembly retain the same relative positions but the rack and the transfer mechanism are relatively moveable from one to the next of a series of fixed relative positions so that the transfer mechanism can select each sample in turn for transfer to the weight-sensing assembly, and wherein in any fixed relative position of the rack and the transfer mechanism, the gap between two adjacent transverse spacer members of the rack, the arm of the transfer mechanism and the slot of the sample receptacle are substantially in alignment.

3,991,620
APPARATUS FOR DETERMINING IMBALANCE OF TIRES AND THE LIKE

Vernon R. Fencl, Northbrook, and Demetrios J. Rigas, Skokie, both of Ill., assignors to Grotnes Machine Works, Inc., Chicago, Ill.

Filed May 8, 1975, Ser. No. 575,750
Int. Cl.² G01M 1/16
U.S. Cl. 73—462 4 Claims



1. Apparatus for single plane, balance determination of an annular part as, for example, a tire, comprising in combination:

a base;

support means for said annular part, said support means comprising a first and a second generally frusto-conical hub, said first and second hubs being journalled in said base for rotation about a common horizontal axis, said second hub being axially movable;

means to selectively axially position said second hub such that said annular part may be inserted, centered and clamped between said first and second hubs;

means for rotatably driving said support means and said annular part at a constant rotational speed about the axis of said support means, said driving means comprising a housing and a drive shaft, said drive shaft being coupled to said support means; and

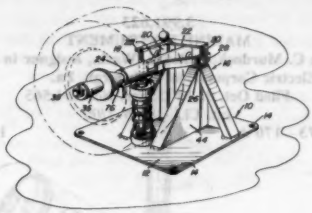
torque absorbing and monitoring means interposed between said driving means housing and said base, said torque absorbing and monitoring means serving to counteract the reaction torque exerted by said driving means housing relative to said base as a result of the driving of said support means and said annular part by said driving means, said torque absorbing and monitoring means providing an indication of the magnitude of said reaction torque as said support means and annular part are driven.

3,991,621
ROTATABLE VEHICLE WHEEL SUPPORT FOR SPIN BALANCER

Joseph M. Armbruster, P.O. Box 840, Waynesville, N.C. 28786

Filed Aug. 29, 1975, Ser. No. 609,099
Int. Cl.² G01M 1/16
U.S. Cl. 73—479 9 Claims

1. A support for spin balancing a vehicle wheel having a tire mounted thereon, said support including a base, an upright having its lower end supported from said base, a generally horizontal support arm having one end supported from an upper end of said upright for oscillation about a horizontal axis extending transversely of said support arm and a free end portion projecting over said base, said free end portion including journal means for journaling a vehicle wheel therefrom with the axis of rotation of said wheel extending longitudinally of said arm, and upstanding compression spring means supported at its lower end from said base, and connecting means connecting the upper end of said spring to the free end portion

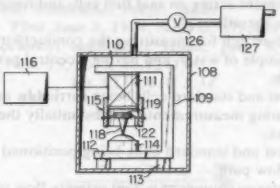


of said support arm between said journal means and the axis of oscillation of said support arm.

3,991,622
APPARATUS FOR MEASURING AIRTIGHTNESS OF SEALED BODY

Takeshi Oowada, Tokyo, Japan, assignor to Hisanao Aihara, Tokyo, Japan

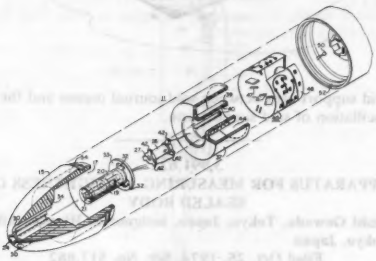
Filed Oct. 25, 1974, Ser. No. 517,882
Claims priority, application Japan, Nov. 5, 1973, 48-124269; Apr. 30, 1974, 49-48974
Int. Cl.² G01M 3/36
U.S. Cl. 73—49.3 1 Claim



1. An apparatus for measuring airtightness of sealed bodies comprising an airtight sealed container for accommodating an object the airtightness of which is to be measured, a support stand contained within said container and upon which said object is positionable, means connected to said container for varying the air pressure inside said container, electromagnetic detecting means comprising a detecting coil fixed to the upper part of said support stand and a sensor disk made of magnetizable material and having a flat surface, an electric source for supplying alternating current to said coil, a cylindrical body secured concentrically to said detecting coil and formed with a plurality of holes on the inside wall thereof, means for resiliently supporting said disk in said cylindrical body with said flat disk surface maintained in a spaced relation with said coil such that said disk and coil mutually have an electromagnetic influence on each other when an alternating current is fed to said coil, said disk body being formed with a plurality of annular grooves about its periphery and a detecting needle extending out from the center of the side opposite said flat surface for contacting a surface of an object positioned on said support stand, said resilient disk supporting means including a plurality of pairs of resilient wires respectively having an arcuate central part and straight extensions at both ends, said wires being fitted in said annular grooves of the disk body at said arcuate part and inserted in said holes of the cylindrical body at said extensions, said surface of the object to be measured being deformable in response to a variation in air pressure within said container, and means connected to said coil for measuring reactance variations in the alternating current fed to said coil occurring upon a shift of said disk in response to a deformation of the object when the air pressure inside

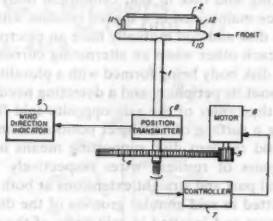
said container is varied whereby a determination of the airtightness of the object may be made.

3,991,623
MARINE INSTRUMENT
Lawrence C. Murdock, Bellevue, Wash., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 9, 1973, Ser. No. 404,565
Int. Cl.² G01W *1/00*
U.S. Cl. 73—170 A **10 Claims**



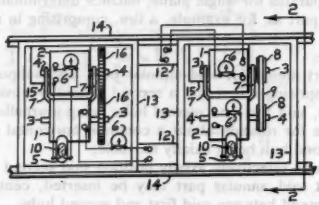
1. A marine instrument comprising:
a. a body for use in the water environment and having a nose portion which includes a primary flow path through said nose portion for passage of said water environment;
b. a first cell for measuring the conductivity of said water environment acting on said first cell, and having a central passage therethrough;
c. a standard cell for measuring the conductivity of a standard sample of water, and having a central passage therethrough;
d. said first and standard cells being carried by said body for performing measurements at substantially the same temperature;
e. said first and standard cells being positioned in said primary flow path;
f. said water environment in said primary flow path, passing through said central passages; and
g. circuit means for conveying an indication of said measurements to a utilization means.

3,991,624
WIND VELOCITY SERVO SYSTEM
Leslie Llewellyn Rhys Davies, 88 Winter St., Lexington, Mass. 02173
Filed June 6, 1974, Ser. No. 477,147
Int. Cl.² C01W *1/04*
U.S. Cl. 73—189 **4 Claims**



1. Apparatus for ascertaining wind direction comprising
1. a rotatable support,
2. a first dual element sensor carried by the rotatable support in a manner exposing the dual element sensor to the wind, the first dual element sensor having a pair of closely spaced, elongate, temperature sensitive elements whose electrical resistance is a function of temperature, the pair of elements extending side by side along the sensor's longitudinal axis whereby both elements present the same aspect to the wind when the wind's direction is directly along the sensor's longitudinal axis and the elements present different aspects when the wind is off-axis,
3. means for heating the temperature sensitive elements above the ambient temperature,
4. a motor arranged to turn the rotatable support in the clockwise and counterclockwise directions, and
5. means responsive to electrical signals obtained from the pair of temperature sensitive elements for causing the motor to turn the rotatable support to the position where the wind direction is along the longitudinal axis of the sensor.

3,991,625
GRAVITY-MEASURING DEVICE FOR WATER AND MINERAL DETECTION
James N. Preston, 1633 W. Campbell, Phoenix, Ariz. 85015
Filed Nov. 10, 1975, Ser. No. 630,680
Int. Cl.² G01V *7/12*
U.S. Cl. 73—382 **2 Claims**

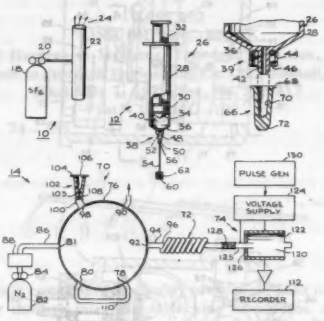


1. A portable gravity-measuring device comprising: any portable source of electrical current being electrically-connected to an electric motor through electric wiring and meter means to measure and indicate the amount of electric current flow through the circuit; the electric motor being fastened to a portable frame; one or more arms being rotatably suspended from the axle of the electric motor through bearing means and fastened to the housing of an electric generator so that the generator and arms swing freely around the axle of the electric motor; the generator axle being connected to the motor axle through torque transmitting means so that the axle of the motor operates to turn the axle of the generator when the motor is activated with electricity; electricity generated by the electric generator being conducted from one electrical terminal to the other electric terminal of the generator through an electric circuit that includes meter means and electric switching means in the circuit, wired in series circuit; the electric switching means being fastened to the generator and activated by the force of earth gravity so that it operates to electrically-connect the generator circuit from one terminal to the other whenever the generator is located in a lower plane than the horizontal plane of the electric motor and then disconnects the electric current in said circuit whenever the torque of the electric motor and resistance of the electric generator swings the electric generator around to an elevation equal to that of the motor above the level of the earth; when moved from place to place above the surface of the earth, variations in the current reading of the motor circuit and variations in the current reading of the generator circuit through their respective meter means both indicate variations in the force of gravity intensity of minerals and water or the lack of them beneath the surface of the earth.

3,991,626
ANALYSIS SYSTEM FOR AN ATMOSPHERE TRACER DISPERSION SYSTEM

Frederick H. Shair, Altadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Apr. 7, 1975, Ser. No. 565,780
Int. Cl.² G01N 1/24
U.S. Cl. 73—421.5 R **3 Claims**



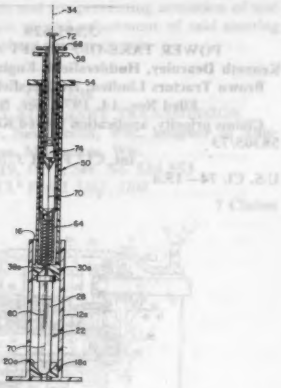
1. A gas analysis system comprising in combination:
- a piston-pump sampler comprising a hypodermic syringe including a synthetic, plastic housing defining a sample chamber, a piston housed with the chamber, a plunger secured to the piston and extending out of one end of the chamber, an outlet at the other end of the chamber and a threaded annular member secured to said body surrounding said outlet;
- a gas analysis unit having an inlet adapted to sealingly engage the threaded annular member of the sampler outlet during injection of sample into the unit;
- a needle assembly configured to sealingly and releasably engage said threaded annular member; and
- a sealing member adapted to releasably and sealingly engage said threaded annular member.

3,991,627
ALIGNMENT DEVICE FOR SAMPLE CONTAINERS

Cleve Watrous Laird, Acton, and Noboru Matsu, Marblehead, both of Mass., assignors to Block Engineering, Inc., Cambridge, Mass.

Filed Nov. 28, 1975, Ser. No. 636,157
Int. Cl.² G01N 1/10
U.S. Cl. 73—423 R **35 Claims**

1. A device for orienting an elongate container along a predetermined axis comprising:
- means defining a first tapered cavity for receiving one end of said container;
- means for supporting the other end of said container in a temporary position when said one end is disposed in said first tapered cavity; and
- means defining a second tapered cavity for receiving said other end of said container;
- said means defining said first tapered cavity and said means defining said second tapered cavity being movable relative to one another so that during relative motion of said means defining said first and second cavities toward one another, said other end of said container is engaged by said second cavity and is moved from said temporary

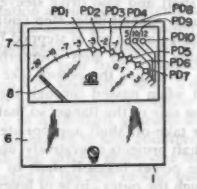


position to bring said container into alignment with said predetermined axis.

3,991,628
LEVEL METER FOR SOUND SIGNALS

Shizuo Narita, Tokyo, Japan, assignor to Kabushiki Kaisha Nihon Keiki Seisakusho, Tokyo, Japan

Filed June 3, 1974, Ser. No. 475,436
Claims priority, application Japan, June 5, 1973, 48-65825[U]; Nov. 15, 1973, 48-127736
Int. Cl.² G01H 3/14
U.S. Cl. 73—557 **6 Claims**



1. A level meter for sound signals comprising means for rectifying an input sound signal and applying said rectified input signal to a moving coil of a moving-coil type meter to indicate a substantially mean value of said input sound signal; a peak value detection circuit coupled to the input of said moving coil meter and to said means for rectifying said input sound signal for detecting a peak value of said rectified input signal; a level selection circuit for producing an output signal when the peak value of said input sound signal exceeds each of a plurality of predetermined levels, said level selection circuit coupled to said peak value detection circuit; and a plurality of light indication elements, each said light indicating element coupled to said level selection circuit with a predetermined light indication element corresponding to the output of said level selection circuit at a predetermined level and being actuated upon receipt of said output signal, each said light indication element disposed along a graduated scale, said graduated scale also being used by a pointer of said moving-coil type meter,
- whereby the mean value of the input signal is indicated on said scale by deflection of said pointer of said moving-coil type meter to a graduation corresponding to said mean value, and the peak value thereof is indicated on said

scale by one of said light indication elements disposed at the graduation corresponding to said peak value.

3,991,629

POWER TAKE-OFF SHAFT ASSEMBLIES

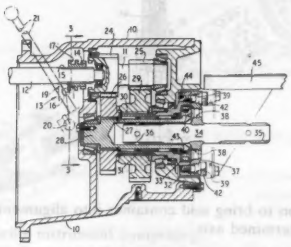
Kenneth Dearnley, Huddersfield, England, assignor to David Brown Tractors Limited, Huddersfield, England

Filed Nov. 14, 1974, Ser. No. 523,927

Claims priority, application United Kingdom, Dec. 17, 1973, 58305/73

Int. Cl.² F16H *37/00*

U.S. Cl. 74—15.4 **5 Claims**



1. A power take-off shaft assembly comprising a hollow drive shaft rotatable at a first speed; a drive sleeve surrounding the hollow drive shaft and rotatable simultaneously at a second speed; a power take-off shaft provided with differently splined end zones each of which is adapted to fit within the hollow drive shaft, and with a flange between said zones; means providing for selective engagement of said flange with one of said hollow drive shaft or said drive sleeve and for preventing erroneous engagement of said flange with either both of said drive shaft and said drive sleeve or with the wrong one of said drive shaft and said drive sleeve, comprising an inner circle of equally spaced holes step counterbored at the other side of the flange and a set of stepped bolts, each being matingly interfittable in said step counterbored holes and adapted driveably to secure the power take-off shaft to the hollow drive shaft when passed through the inner circle of holes from said one side of the flange, so that the splined end zone of the power take-off shaft appropriate to the speed of the hollow drive shaft projects operatively, and adapted driveably to secure the power take-off shaft to the drive sleeve when passed through the outer circle of holes from said other side of the flange, the power take-off shaft having been turned end-for-end so that its splined end zone appropriate to the speed of the drive sleeve then projects operatively each of said bolts having a length dimension insufficient to engage one of said drive sleeve said drive shaft when incorrectly inserted, whereby attempted insertion of a bolt into a hole not counterbored on a side of the flange into which such insertion is attempted leaves said bolt short of possible engagement with one of said drive shaft or said drive sleeve; and means for providing a clearance between the flange and that one of the hollow drive shaft and the drive sleeve to which the power takeoff shaft is not for the time being driveably secured.

3,991,630

VARIABLE FEED DRIVE MECHANISM

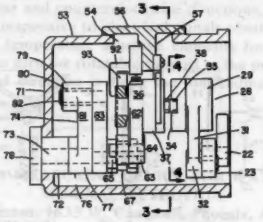
Daniel J. Toby, South San Francisco, Calif., assignor to Toby Enterprises, South San Francisco, Calif.

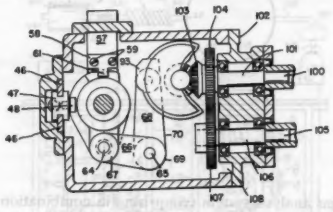
Filed Sept. 26, 1974, Ser. No. 509,472

Int. Cl.² F16H *29/04*

U.S. Cl. 74—117 **12 Claims**

1. A variable drive mechanism, comprising: oscillating means driven in drive oscillating motion; unidirectional clutch means for converting oscillating motion to unidirectional rotational motion; linkage means including a plurality of linking members drivingly extending between said oscillating means and said unidirectional clutch means for transferring the drive oscillating motion to said unidirectional clutch means; adjustment means for varying the angular relationships of said linking members to adjust the amount of said drive oscillating motion transferred thereby; said linkage means including a first linking member pivotally secured at one end to said oscillating means, an adjustment lever pivotally jointed





at one end to a fixed pivot, a second linking member pivotally joined at one end to the other end of said adjustment lever, the other end of said second linking member being pivotally joined to the other end of said first linking member, a third linking member pivotally joined at one end to said unidirectional clutch means; and the other end of said third linking member is pivotally secured to at least one of the other end of said first linking member and the other end of said second linking member.

3,991,631

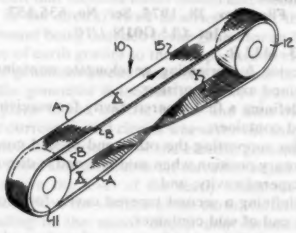
WOVEN ENDLESS BELT OF A SPLICELESS AND MOBIUS STRIP CONSTRUCTION

J. Lehman Kapp, P.O. Box 522, Brevard, N.C. 28712

Filed Sept. 4, 1975, Ser. No. 610,314

Int. Cl.² F16G *1/00*

U.S. Cl. 74—231 MB **3 Claims**



1. An endless belt suitable for being rotated during use in various manufacturing and material handling operations and the like and characterized by a construction having an in-

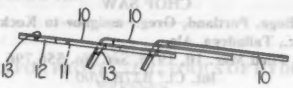
creased surface and edge wear potential, said belt comprising a woven endless fabric strip of predetermined width and length and defining opposing outside and inside surfaces and lefthand and righthand edges and being of a spliceless and Mobius strip construction having a 180° turn in said surfaces thereof for providing in effect one spliceless continuous surface and one spliceless continuous edge of twice the predetermined length of said belt during rotation thereof by the inside surface reversing and becoming the outside surface and the lefthand edge reversing and becoming the righthand edge during each complete revolution of said belt.

3,991,632

LINK DRIVING BELTS

Edward Hargreaves Stephens, Tanworth in Arden, England, assignor to Fearnhill Engineering Co. Ltd., Solihull, England

Filed May 7, 1975, Ser. No. 575,417
Int. Cl.² F16G *1/00*
U.S. Cl. 74—235 **4 Claims**



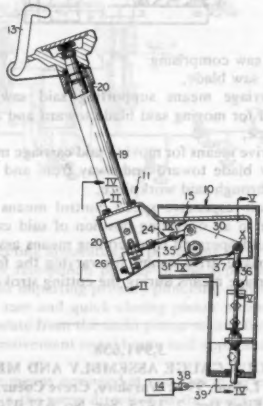
1. A belt comprising a plurality of separate links connected together through integral interlocking formations, and anti-friction material located between adjacent faces of the links which are in contact with one another.

3,991,633

ADJUSTABLE STEERING COLUMN ASSEMBLY

John Molnar, Aurora, and James E. Schimpf, Joliet, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 11, 1975, Ser. No. 595,478
Int. Cl.² B62D *1/18*; G05G *5/18*
U.S. Cl. 74—493 **20 Claims**



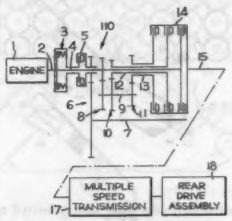
1. A steering arrangement comprising
a stationary support,
a steering column assembly, including steering means movably mounted thereon and a bracket,
pivot means pivotally mounting the bracket of said steering column assembly on said support for selective adjustment about a pivot axis disposed transversely relative to said steering column assembly,
a steering valve, and
actuating means, including a member pivotally mounted on said bracket, operatively interconnected between said steering means and said steering valve for selectively actuating said steering valve in response to movement of said steering means and for preventing actuation of said steering valve upon pivotal adjustment of said steering column assembly about said pivot axis.

3,991,634

COUNTERSHAFT AUXILIARY TRANSMISSION

Donald W. Longshore, New Berlin, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 19, 1974, Ser. No. 534,553
Int. Cl.² F16H *3/02*, *3/08*
U.S. Cl. 74—745 **7 Claims**



1. An auxiliary countershaft transmission comprising, a drive shaft, an input shaft and a plurality of quill shafts mounted for forward rotation about a common axis, an engine driven clutch for selectively engaging and disengaging power transmission between said drive shaft and said input shaft, a power take-off countershaft mounted for rotation about an axis parallel with said common axis, a power take-off gearset driving said power take-off countershaft, a hydraulic power take-off clutch between said drive shaft and power take-off gearset for selectively transmitting power to said power take-off countershaft, a clutch carrier and an output shaft rotatably mounted for rotation about said common axis, a countershaft mounted for rotation about an axis parallel with said common axis, a countershaft gearset continuously driving said countershaft including a drive gear fixed to said input shaft for synchronous rotation with said input shaft, a driven gear fixed to said countershaft for synchronous rotation with said countershaft, a plurality of quill shaft gearsets including two drive gears integrally connected to said countershaft and in driving engagement with two driven gears, one of said driven gears integrally connected to the first of said quill shafts, the other of said driven gears integrally connected to another of said quill shafts, a clutch hub on each of said input shaft and said quill shafts, a plurality of hydraulic clutches on said clutch carrier, a friction member on each of said clutch hubs, each of said clutches on said clutch carrier including at least one friction member on a mating clutch hub for selectively transmitting power from said input shaft to said output shaft selectively through said input shaft and said countershaft and one of said quill shafts to thereby selectively provide a plurality of forward speed ratios through said auxiliary countershaft transmission.

3,991,635

ADJUSTABLE EXTRACTION PLIERS

Thomas E. Marone, 109 Cherry Lane, Boonton, N.J. 07005

Filed Mar. 4, 1976, Ser. No. 663,874
Int. Cl.² B25B *7/02*
U.S. Cl. 81—420 **4 Claims**

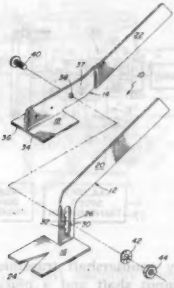
1. A pliers-like extraction tool for the removal of hollow wall toggle bolt fasteners comprising:
a pair of antipodal substantially rectangular jaw plates being upper and lower jaw plate members, having integrated angled flat surface handle-lever members extending from the upper surface thereof, each handle being pivoted and

slidable by the flat surface of the other and cooperating in the operation of said antipodal jaws;

said lower jaw plate, having an handle end, extending somewhat beyond said upper plate to accommodate said integrated handle-lever;

said lower plate having a forked notch, mediately and symmetrically positioned on the plate end opposing said handle end, engageable upon a flange of said toggle bolt;

said upper plate angled handle member having an inner portion integrated longitudinally along said plate and extending substantially parallel to the plane of said plate and an outer portion angled acutely upwards from the horizontal plane of said plate;



said lower plate handle member being angled obtusely to the plane of said lower plate having an inner portion extending vertically from and perpendicularly to said lower plate and an outer portion angling upwards acutely from the horizontal plane of said jaw plate;

a bore mediately positioned in said inner portion of said upper jaw handle member;

a ridged longitudinal slot mediately positioned in said inner portion of said lower jaw plate handle member to provide adjustability; and

pivot pin means to movably secure said handles.

3,991,636

CONTROL APPARATUS FOR A MACHINE FOR CUTTING A WORKPIECE

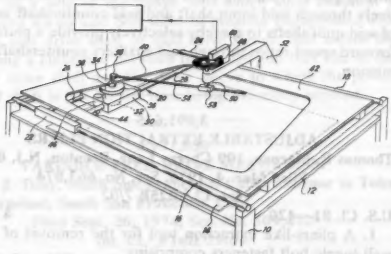
Julien Devillers, Livry Gargan, France, assignor to Intercontinental Trading Company - Intraco, Puteaux, France

Filed July 1, 1974, Ser. No. 484,573

Claims priority, application France, July 12, 1973, 73.25551

Int. Cl.² B26D *3/08*

U.S. Cl. 83—12 **10 Claims**



1. Control apparatus for a machine for cutting a workpiece by means of a cutting tool in displacement against the workpiece, which control apparatus is operable to impose a program of speeds on this displacement, the said machine comprising a horizontal table to support the workpiece, a horizontal jig which defines a path for cutting, a freely displaceable carriage equipped with the cutting tool and a motor adapted to displace the carriage along the jig; the said apparatus comprising: a programming element having zones of varying transparency or reflectance; an emitter unit for emitting light beams to the programming element an an associated receptor unit for receiving the light beams which have been transmitted or reflected; means for turning the programming element so that one complete rotation of the programming element corresponds to one complete displacement of the carriage along the jig; an electric circuit connected to the receptor unit and to the motor for controlling the speed of rotation of the motor as a function of the intensity of the signal provided by the receptor unit so that the speed of displacement of the cutting tool varies during the movement along the path according to the program defined by the zones of the programming element.

3,991,637

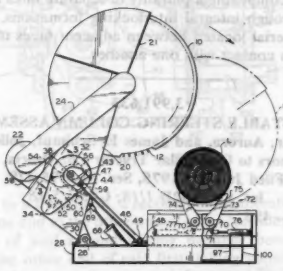
CHOP SAW

Dallas F. Boge, Portland, Oreg., assignor to Kockum Industries, Inc., Talladega, Ala.

Filed Mar. 10, 1975, Ser. No. 556,796

Int. Cl.² B27B *7/00*

U.S. Cl. 83—490 **13 Claims**



1. A chop saw comprising:

a powered saw blade,

a saw carriage means supporting said saw blade and mounted for moving said blade toward and away from a workpiece,

carriage drive means for moving said carriage means to feed said saw blade toward and away from and in a cutting stroke through said workpiece,

and position-responsive speed control means directly responsive to an operating position of said carriage drive means and operated by operating means associated with said carriage drive means for varying the feed speed of said carriage means during the cutting stroke of said saw blade.

3,991,638

RAIL GUN GAUGE ASSEMBLY AND METHOD

Benjamin B. Lefton, 9912 Warshire, Creve Coeur, Mo. 63132

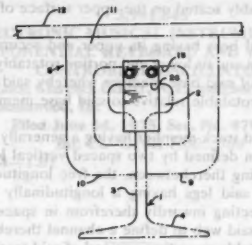
Filed Dec. 2, 1975, Ser. No. 637,020

Int. Cl.² B26F *1/02*

U.S. Cl. 83—50 **4 Claims**

1. In the combination of a railroad rail having a tread, a web, and a foot, and a rail-piercing gun having a support area extending across the tread of said rail, the improvement comprising a gauge comprising a rail-end stop bearing against an end of said rail and an elongate saddle bar connected to said stop, said saddle bar resting on the outer surface of said tread and having in its side away from said tread a plurality of seats spaced therealong a distance equal to the desired lengthwise spacing of fish plate bolt holes, of a length and depth to ac-

commodate closely said gun support area, and of a height from said outer surface of the rail tread to locate the gun at



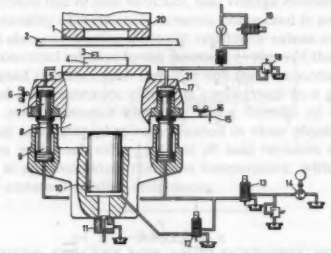
the desired position heightwise of the web between the tread and the foot of the rail.

3,991,639

APPARATUS FOR PROTECTING TOOLS OF HYDRAULIC PRESSES

Friedrich Pfeifer, Waghausel, Germany, assignor to SMG Suddeutsche Maschinenbau-Gesellschaft mbH, Germany

Filed Apr. 23, 1975, Ser. No. 570,862
Claims priority, application Germany, Apr. 23, 1974, 2419390
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.[2] B26D *7/24*
U.S. Cl. 83—61 4 Claims



1. Tool protecting apparatus for protecting tools of hydraulically operated fine-punch presses of the type having main piston means for imparting primary punching movements to a movable press ram and quick-closing piston means arranged at the ram separate from the main piston means for imparting final punching movement to said ram; said apparatus comprising:

keying piston means arranged at said ram in series with and extending in the same direction as the quick-closing piston means, said keying piston means forming a keying gap which is variable in size depending on the resistance pressure applied to the ram by the workpieces being processed and impediments disposed between the workpieces and the ram whereby said keying gap is reduced below a predetermined distance when undersirable impediments above a certain size and rigidity are disposed in the travel path of the ram,

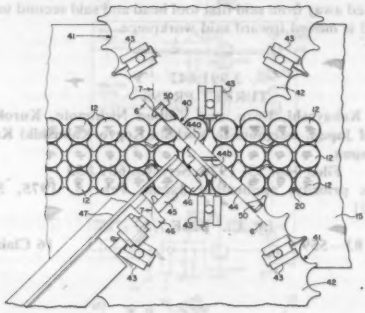
and safety stop switch means operable to stop application of pressing forces to said press ram in response to closing of said gap below said predetermined value.

3,991,640

PACKAGE FORMING MACHINE

David Frederick Schlueter, Hoopeston, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 21, 1976, Ser. No. 651,104
Int. Cl.[2] B26D *1/56*; B65B *21/00*
U.S. Cl. 83—341 7 Claims



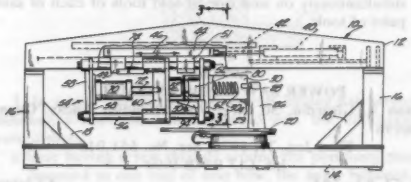
1. In a package forming machine which continuously delivers at least three rows of containers with a strip of applied carrier stock interconnecting said containers in rank and file to a cut-off station, knife blade means rotatively mounted at said cut-off station, and means for rotating said knife blade means in continuously timed relationship to the movement of said at least three rows of containers at said cut-off station to cut said applied carrier stock between certain predetermined ranks which are between the side files of said containers.

3,991,641

PIERCING APPARATUS

Jan C. Knibbe, Detroit, Mich., assignor to Springfield Tool & Die, Inc., Dearborn, Mich.

Filed July 18, 1975, Ser. No. 597,178
Int. Cl.[2] B26F *1/02*
U.S. Cl. 83—440.1 15 Claims



1. Apparatus for performing work on a workpiece comprising:

a frame;

a workpiece mounted to said frame;

work performing means mounted to said frame and including a first tool head and a second tool head disposed on opposite sides of said workpiece;

means for selectively moving said first tool head into engagement with said workpiece while retaining said second tool head in a fixed position with respect to said workpiece or for moving said second tool head into engagement with said workpiece while retaining said first tool head fixed with respect to said workpiece wherein said last mentioned means comprises a support member fixedly connected with said second tool head whereby movement of said support member produces corresponding movement of said second tool head, means connecting said first tool head and said support member and

operable upon actuation to move either said support member or said first tool head with respect to the other and means for selectively locking either said first tool head or said support member to said frame whereby when said support member is locked to said frame and said connecting means are actuated, said first tool head is moved toward said workpiece and when said first tool head is locked to said frame, said support member is moved away from said first tool head and said second tool head is moved toward said workpiece.

3,991,642

TURRET PRESS

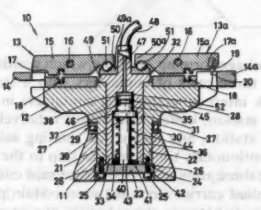
Susumu Kobayashi, Uozu, and Taibun Nishimoto, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Jan. 23, 1976, Ser. No. 651,853

Claims priority, application Japan, Feb. 5, 1975, 50-17356[U]

Int. Cl.² B26F *1/02*

U.S. Cl. 83—559 **16 Claims**



1. A turret press, comprising:

a. a bed;

b. a table movably supported on said bed;

c. a plurality of pairs of coactive tools supported on said table, each of said pairs of tools being receptive of a workpiece therebetween, one of said tools of each said pair being movable with respect to the other; and

d. a power actuator carried on said table and operable simultaneously on said one of said tools of each of said pairs of tools.

3,991,643

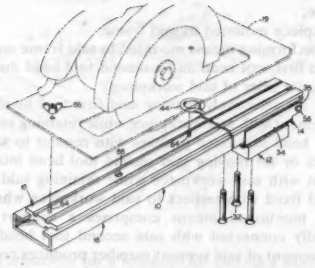
POWER SAW GUIDE ASSEMBLY

Gaston A. Girardin, 30 Birge Ave., Windsor Locks, Conn. 06096

Filed Jan. 21, 1976, Ser. No. 651,043

Int. Cl.² B27B *9/04*

U.S. Cl. 83—564 **4 Claims**



1. A power saw guide assembly comprising:

a. a base member adapted for mounting on a saw table or the like and having a recess of circular cross section opening in the upper surface thereof;

b. a mounting member having a generally horizontal plate portion slidably seated on the upper surface of said base member;

c. a cylindrical boss having its upper end secured to said plate portion and its lower end portion rotatably seated in said recess of said base member whereby said mounting member is rotatable relative to said base member about a first axis;

d. an elongated track member having a generally U-shaped cross section defined by two spaced vertical legs with a web extending therebetween, the free longitudinal edge of each of said legs having a longitudinally extending flange projecting inwardly therefrom in spaced parallel relation to said web to define a channel therebetween;

e. means pivotably mounting one end of said track member to said mounting member for pivotal movement about an axis perpendicular to said first axis; and

f. an elongated slide member adapted for mounting a power saw thereon and slidably disposed in said channel, said slide member having a pair of vertical side surfaces each having a longitudinal groove therein in which is slidably received one of said flanges.

3,991,644

METHOD FOR CONTROLLING THE CUTTING FEED SPEED OF A SAW FRAME OF BAND-SAWING MACHINE OR SIMILAR MACHINE

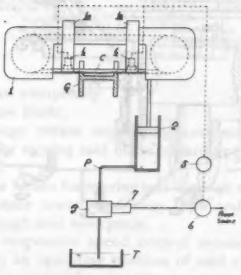
Tadahiro Sugimoto, Amagasaki, Japan, assignor to Daito Seiki Company, Ltd., Japan

Filed Dec. 3, 1974, Ser. No. 529,105

Claims priority, application Japan, Dec. 4, 1973, 48-13663; Mar. 11, 1974, 49-28346

Int. Cl.² B23D *55/08*

U.S. Cl. 83—800 **9 Claims**



1. In combination with a sawing machine having blade means with a continuous sawing edge, a vertically movable saw frame on which said blade means is rotatably mounted, and an oil cylinder coupled to said saw frame for making said saw frame rise and descend, an apparatus for controlling the descending speed of the saw frame, comprising a detecting element engaged with one of the parts of said sawing machine for continuously detecting a change of the cutting resistance to said blade means and producing an electrical output, an amplifier connected to said detecting element for amplifying the output, a motor controlling device connected to said amplifier, a speed change motor driven by said motor controlling device and a flow control valve connected to said speed change motor for controlling the flow of oil, an exhaust conduit in which said flow control valve is connected and being in turn connected with said oil pressure cylinder for automatically regulating the quantity of oil under pressure exhausted from said oil cylinder in response to the change of cutting resistance of the saw blade for automatically changing the

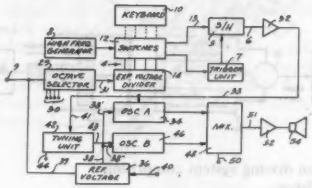
speed of descent of the saw frame in response to the change of cutting resistance to effect cutting while keeping the cutting resistance uniform.

3,991,645

ELECTRONIC MUSICAL INSTRUMENT WITH EXPONENTIAL KEYBOARD AND VOLTAGE CONTROLLED OSCILLATOR

David A. Luce, Clarence Center, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed June 14, 1975, Ser. No. 479,444
Int. Cl.² G10H *1/00, 5/04*
U.S. Cl. 84—1.01 **10 Claims**



1. An electronic musical instrument having a voltage controlled oscillator for producing a sound signal having a frequency proportional to a control voltage applied to it, a keyboard having a plurality of keys, a plurality of switches, one for each of said keys, each adapted to be operated by depression of its associated key, and a voltage divider connected with said switches for connecting a control voltage to said oscillator which corresponds to the position of the key associated with an operated one of said switches, said voltage divider comprising a plurality of resistance elements connected in series, each of said elements having different resistance values which bear an exponential relation to the resistance values of the adjacent connected resistors such that the voltage at successive junctions of said resistance elements correspond to a geometric series, said resistance elements being formed of the same material and being physically located in close physical juxtaposition with each other, so that all said resistors are maintained at approximately the same temperature, with approximately constant relative resistances.

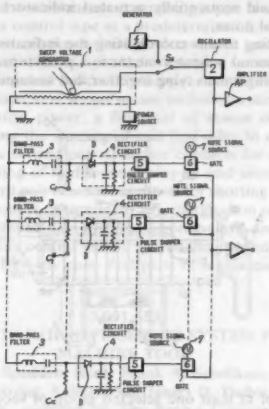
3,991,646

ARPEGGIO CIRCUIT FOR AN ELECTRONIC MUSICAL INSTRUMENT

Ikutaro Kakehashi, Osaka, Japan, assignor to Roland Corporation, Osaka, Japan

Filed Sept. 9, 1975, Ser. No. 611,607
Claims priority, application Japan, Sept. 30, 1974, 49-113196
Int. Cl.² G10H *1/02, 1/06*
U.S. Cl. 84—1.24 **10 Claims**

1. An arpeggio circuit for an electronic keyboard instrument comprising means for generating a desired sweep voltage which is continuously varied, a voltage control type oscillator connected to said generator for generating a sweep frequency which is varying in proportion to the sweep voltage, a plurality of pulse generating means, one for each note of the keyboard instrument, and each having a series connected resonance circuit means and pulse forming means for forming a pulse in response to the output from said resonance circuit means, said pulse generating means being connected to said oscillator in parallel with each other, tone generator means coupled to the outputs of the respective pulse generating means for generating tone signals in response to the outputs of the pulse generating means, and arpeggio producing means coupled to said pulse generating means for cancelling the output of said resonance circuit means for all of the pulse generating means



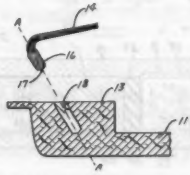
other than the pulse generating means corresponding to the notes of the arpeggio.

3,991,647

METHOD AND APPARATUS FOR ATTACHING HAIRS TO A BOW FOR A STRINGED INSTRUMENT

Myron E. Darling, Webster City, Iowa, assignor to B.J.D. Industries, Blairsburg, Iowa

Filed May 5, 1975, Ser. No. 574,274
Int. Cl.² G10D *1/02*
U.S. Cl. 84—282 **5 Claims**



1. In a bow for stringed instruments having hair stretched between a rear end and a forward end, the improvement comprising;

a bore having screw threads around the periphery thereof disposed in one end of said bow, the angle between the stretched portion of the hair and the longitudinal axis of said bore being substantially less than 90°;

a member disposed around one end of the hair, said member having an irregular surface on the exterior thereof, said member and said one end of the hair being disposed in said bore.

3,991,648

MUSIC TEACHING DEVICE

John F. Karpowicz, St. Louis, Mo., assignor to Amerel Corporation, St. Louis, Mo.

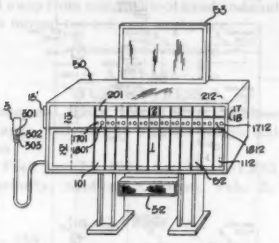
Filed Mar. 14, 1975, Ser. No. 558,232
Int. Cl.² G09B *15/00;* **G10B** *15/00*
U.S. Cl. 84—470 **8 Claims**

1. In a device for teaching musical time comprehension:

a. a first indicator means including a plurality of sequentially actuated lighted indicators defining musical beats of equal duration,

b. a second indicator means including a plurality of selectively actuated, sustainable lighted indicators, associated with said sequentially actuated indicators and defining musical notes,

c. actuating means coordinating the indication of the first and second indicator means in a predetermined relation, including means tying together and sustaining the indication of at least one selected group of second indicators having a duration defined by a plurality of associated first indicators for simultaneous indication of said group coincidentally with the visual indication of the first of said first indicators and in advance of the visual indication of the last of said first indicators said group indication having a duration greater than the indication of said first associated indicator.



3,991,649

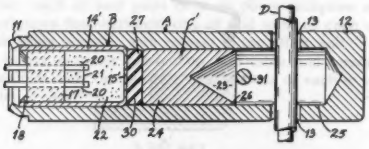
PYROTECHNIC WIRE CUTTER

Mihai D. Patrichi, Los Angeles, Calif., assignor to Networks Electronic Corporation, Chatsworth, Calif.

Filed June 27, 1975, Ser. No. 591,129

Int. Cl.² F42B 3/00

U.S. Cl. 89—1 B **6 Claims**



6. A pyrotechnic line cutter comprising:

a housing cylinder having a bore and a counterbore separated by an annular shoulder;

an explosive cartridge in said counterbore, having a forward end seated on said shoulder;

said cylinder having an open rear end crimped inwardly against the rear end of said cartridge and securing the same against the reactive force of explosion thereof;

a piston fitted in said bore for forward longitudinal sliding movement therein in response to the expansive forces of explosion of said cartridge, said piston having at its forward end a cutting edge in sliding contact with the wall of said bore;

said cylinder including an integral forward portion having a pair of diametrically opposed apertures through which a line to be cut may extend;

and means normally holding said piston in a retracted position with said cutting edge spaced rearwardly of said line apertures, said means consisting of a pin of shearable material having respective ends mounted in apertures in opposite sides of said cylinder's forward portion, said pin engaging said cutting edge and blocking forward movement of said piston until sheared by explosive projection of said piston;

said bore extending forwardly beyond both sets of said apertures sufficiently for said cutting edge to cut entirely through said line at diametrically opposite positions, leaving a severed section of said line between the forward end of the piston and the forward end of said bore.

3,991,650

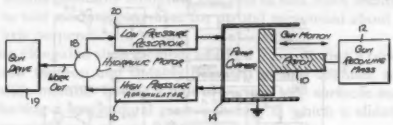
GUN SELF POWERED DRIVE SYSTEM

Newton C. Garland, Burlington; Victor R. Gardy, Shelburne; Lewis K. Wetzel, S. Burlington; August J. Haberstroh, N. Hero; Lawrence R. Folsom, Charlotte; Maurice P. Cloutier, S. Burlington, and Peter L. Chamberlain, Underhill, all of Vt., assignors to General Electric Company, Burlington, Vt.

Filed May 15, 1974, Ser. No. 470,088

Int. Cl.² F41F 19/02

U.S. Cl. 89—43 R **7 Claims**



1. A gun driving system comprising:

a gun drive;

a gun recoiling mass;

a fixed support;

a hydraulic pump means including a group comprising a cylinder and a piston, one member of said group being coupled to said mass and the other member of said group being coupled to said support, whereby said piston has a battery position and a recoil stroke between said battery and recoil positions and a counter-recoil stroke between said recoil and battery positions, for pumping hydraulic liquid in response to movement of said mass relative to said support;

a hydraulic accumulator coupled to said cylinder for receiving hydraulic liquid under pressure therefrom;

a hydraulic liquid under pressure therefrom;

a hydraulic motor coupled to said accumulator for receiving hydraulic liquid under pressure therefrom;

a hydraulic reservoir coupled to said motor for receiving hydraulic liquid therefrom, and coupled to said cylinder for providing hydraulic liquid thereto;

said system having a mode of operation wherein said piston pumps hydraulic fluid under pressure into said accumulator and said motor through substantially the full length of said recoil stroke;

a gun trigger; and

a first valve coupled to and between said accumulator and said motor and to said trigger, for normally blocking the flow of liquid from said accumulator to said motor, and upon actuation of said trigger permitting such flow to drive said motor.

3,991,651

MACHINE FOR REMOVING MATERIAL

Robert S. Klena, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

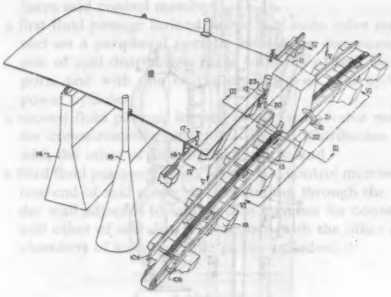
Filed Jan. 15, 1975, Ser. No. 541,242

Int. Cl.² B23C 1/16

U.S. Cl. 90—13 R **5 Claims**

1. A machine for removing material from a workpiece, comprising: track means extending along a curved line through space, said track means being supported without its weight passing through the workpiece; remover means, including a material removing tool, supported on the track means and capable of traveling along the track means, said remover means being supported without its weight passing through the workpiece; workpiece supporting means for holding a workpiece in fixed position relative to the track means;

and a template fixed in position relative to the track means; the remover means including workpiece surface sensing means that control first adjustment means for adjusting the locus of the material removing tool relative to said line through space as the remover means travels along the track means; the remover means including template sensing means that control second adjustment means for further adjusting the locus of the material removing tool relative to said line through space as the remover means travels along the track



means; wherein a plane is defined by the locus of the material removing tool as the remover means is allowed to travel along the track means without permitting adjustments by either of the sensing means; and means to provide that the direction of adjustment of the material removing tool controlled by the template sensing means is perpendicular to said plane and means to provide that the directions of adjustment of the material removing tool controlled by the workpiece surface sensing means are parallel to said plane.

3,991,652

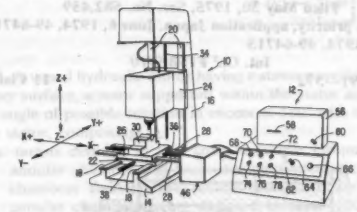
EDUCATIONAL DEVICE FOR TEACHING NUMERICAL CONTROL

Anthony W. Fini, Jr., 4273 Mundy St., Blasdell, N.Y. 14219

Filed May 2, 1975, Ser. No. 574,039

Int. Cl.[2] B23C *1/16*; B23B *39/08*

U.S. Cl. 90—13 C **5 Claims**



1. An educational device for training persons in the principles of numerical control, comprising in combination:

a machine tool assembly comprising a tool and a workpiece holder and drive means for effecting relative movements between the tool and the workpiece holder back and forth along at least two mutually orthogonal axes and at a predetermined rate of relative movement, said drive means comprising a first motor associated with one axis, a second motor associated with the other axis, a source of electrical power, a first relay having a pair of normally open contacts for connecting said first motor to said source, and a second relay having a pair of normally open contacts for connecting said second motor to said source, each relay having a winding; and

control means for energizing each motor in programmed fashion to obtain desired relative movements along said axes, said control means comprising a tape feed means for feeding a control tape at a predetermined feed rate bearing a fixed relation to said predetermined rate of relative movement effected by said drive means, sensor means for sensing control indicia to energize and deenergize said drive means, said sensor means including a second source of electrical power, a first pair of sensor contacts for connecting the winding of said first relay to said second source, a second pair of sensor contacts for connecting the winding of said second relay to said second source, and a third pair of sensor contacts for shorting across said second source to terminate any energization of the winding of either of said first and second relays, and a control tape having control indicia spaced longitudinally thereon which selectively close said pairs of sensor contacts.

3,991,653

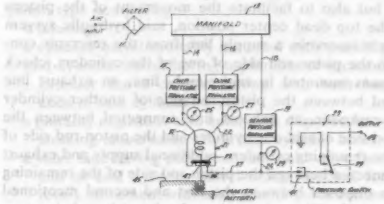
PNEUMATIC FAIL-SAFE SENSOR SYSTEM FOR N/C MACHINE TOOL

Floyd E. MacSpadden, Kent; Frank A. Schellhase, Issaquah; Robert L. Strong, Auburn, and Jansey D. Tieden, Puyallup, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 25, 1974, Ser. No. 518,090

Int. Cl.[2] B23D *5/04*; B23C *1/16*

U.S. Cl. 90—62 R **12 Claims**



1. In an N/C machine tool, adapted to cut a part in accordance with a program that includes a probe adapted to follow a master pattern as the part is being cut, the improvement comprising a pneumatic sensor system, said pneumatic sensor system including:

a pneumatic valve mechanism including a movable element and a valve seat, said movable element adapted to open and close an aperture formed in said valve seat;

a probe connected to said movable element and normally spaced from said master pattern, said probe adapted to contact said master pattern whenever said N/C machine deviates from the cutting path established by said program, said probe being displaced when it comes in contact with said master pattern, said master pattern probe contact causing said movable element of said valve mechanism to be displaced and open said aperture formed in said valve seat;

a pneumatic pressure source for applying pneumatic pressure to said aperture in said valve seat;

pneumatic pressure sensing means for sensing drops in the pneumatic pressure applied to said aperture in said valve seat, said pneumatic pressure drops occurring when said movable element of said pneumatic valve mechanism is displaced by said probe coming in contact with said master pattern; and,

electronic control means connected to said pneumatic pressure sensing means for detecting when said pneumatic pressure sensing means detects a drop in the pneumatic pressure applied to said aperture in said valve seat and generating control signals suitable for terminating the

operation of said N/C machine tool in a rapid manner when a said pneumatic pressure drop is detected.

3,991,654

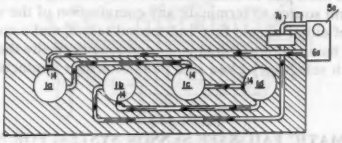
HYDRAULIC SYSTEM FOR USE IN ENGINES HAVING RECIPROCATING PISTONS AND ROTARY PISTON RODS

Joseph M. Rossi, 2015 Cedar Ave., Scranton, Pa. 18505

Continuation-in-part of Ser. No. 296,548, Oct. 11, 1972, abandoned. This application Mar. 4, 1975, Ser. No. 555,170

Int. Cl.² F01B *31/10, 3/00, 1/02*

U.S. Cl. 91—186 **2 Claims**



1. In a multi-cylinder engine having a piston slidably mounted on a piston rod in each cylinder to impart rotary movement to said piston rod operatively connected to a drive shaft including a fly wheel for moving the piston to a bottom dead center position, and a driving fluid provided above the piston to move the piston to a bottom dead center position during a top stroke, the improvement comprising, an unpressurized hydraulic system operatively connected to the piston rod side of the pistons for not only lubricating the piston and cylinder but also to facilitate the movement of the pistons toward the top dead center position, said hydraulic sysyem including a reservoir, a supply line from the reservoir connected to the piston-rod side of one of the cylinders, check valve means mounted in said supply line, an exhaust line connected between the piston-rod side of another cylinder and the reservoir, an exhaust line connected between the piston-rod side of said one cylinder and the piston-rod side of one of the remaining cylinders, additional supply and exhaust lines connected between the piston-rod side of the remaining cylinders disposed between the first and second mentioned cylinders, said additional supply and exhaust lines being connected to the respective cylinders in accordance with the particular operating cycle of the engine such that the exhaust lines in said one of the remaining cylinders and in each of the succeeding remaining cylinders also function as the supply line for the next succeeding cylinder in the operating cycle, and check valve means mounted in said additional supply and exhaust lines, whereby when the piston in the first-mentioned cylinder moves to the top dead center position a volume of hydraulic fluid is drawn from the reservoir into the piston-rod side of said first cylinder, during the power stroke of the piston in said first cylinder the volume of fluid being exhausted therefrom into the piston-rod side of the next remaining cylinder and successively to the other remaining cylinders in the order of the operating cycle of the engine thereby forcing the respective pistons to the top dead center position.

3,991,655

HYDROACOUSTIC APPARATUS AND VALVING MECHANISMS FOR USE THEREIN

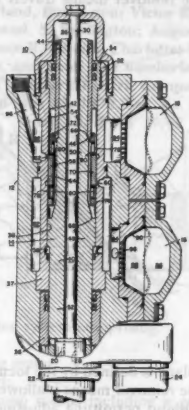
John V. Bouyoucos, Rochester; Roger L. Selsam, Fairport, and Robert O. Wilson, Rochester, all of N.Y., assignors to Hydroacoustics Inc., Rochester, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,823

Int. Cl.² F01B *7/18;* **F01L** *17/00*

U.S. Cl. 91—276 **26 Claims**

1. For use in hydraulic oscillator apparatus in which a pressure actuated mass mechanically actuates a valve element to modulate the flow of hydraulic fluid for producing pressure variations to sustain the oscillation of the mass, said valve element being freely movable until actuated by said mass and then being movable by said mass together therewith over a substantial portion of the trajectory of said mass, a valve mechanism which comprises means including said valve element for partially confining a volume of said fluid beteween said valve element and said mass when said mass moves into and out of actuating relationship with said element, one of said element and said mass having a portion which defines one of the boundaries of said partially confined volume, said portion



having a taper for controlling the flow and displacement of said fluid out of and into said partially confined volume as said mass moves into and out of actuating relationship with said element, respectively, whereby to gradually accelerate and decelerate the relative motion of said valve element and said mass as said mass moves into and out of actuating relationship with said valve element, respectively, to control the motion of said valve element.

3,991,656

SERVO VALVE DEVICE IN POWER STEERING APPARATUS

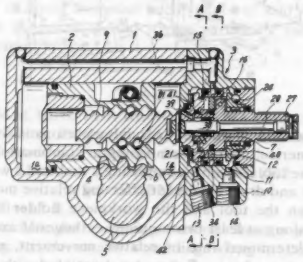
Toshimasa Miyata, Chiryu, and Kenji Takahashi, Kariya, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan

Filed May 30, 1975, Ser. No. 582,459

Claims priority, application Japan, June 6, 1974, 49-64714; June 6, 1974, 49-64713

Int. Cl.² F15B *9/10*

U.S. Cl. 91—372 **11 Claims**



1. In a power steering device having a hydraulic power cylinder containing a piston slidable therein, having cylinder chambers at both sides thereof and a screw shaft so as to actuate steered wheels and a servo valve means serving to distribute fluid under pressure to said hydraulic power cylin-

der in response to the movement of a steering wheel, said servo valve means comprising:

a valve housing;

a main valve member rotatably mounted in said valve housing for rotating in response to the movement of said hydraulic power cylinder;

a control member rotatably mounted in said main valve member for controlling fluid under pressure to a pair of distribution ports and from a pair of injection ports, each of which ports is formed in said main valve member and faces said control member;

a first fluid passage formed within said main valve member and on a peripheral portion thereof for communicating one of said distribution ports with one of said injection ports and with one of the chambers of said hydraulic power cylinder;

a second fluid passage formed in said main valve member for communicating the other of said distribution ports with the other of said injection ports; and

a third fluid passage formed within said control member and one end of said screw shaft extending through the cylinder wall adjacent to said control member for connecting said other of said distribution ports with the other of the chambers of said hydraulic power cylinder.

3,991,657
VANED HYDRAULIC MOTOR

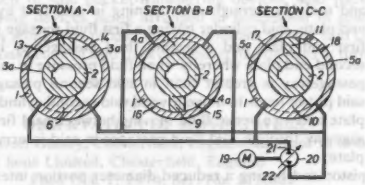
Heinrich Münch, Hamburg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed May 27, 1975, Ser. No. 580,961

Claims priority, application Germany, May 27, 1974, 2425496

Int. Cl.² F15B 11/16

U.S. Cl. 91—411 A **4 Claims**



1. A vaned hydraulic motor having a stator provided with an inner surface, a rotor supported within the stator and having an angle of possible rotation in excess of 180° with respect to the stator, comprising

a. means defining in said rotor a middle circumferential annular chamber and two outer circumferential annular chambers flanking the middle annular chamber, said annular chambers being disposed in axial juxtaposition and each having a floor surface; the axial width dimension of each of the outer annular chambers being one half of the axial width dimension of the middle annular chamber; and

b. first and second radial partitions forming a separate partition pair in each said annular chamber for subdividing each said annular chamber into two pressure chambers; said first partition of each pair being affixed to said stator and extending radially inwardly from the inner stator surface and being in sliding contact with the floor surface of the respective annular chamber; said second partition of each pair being affixed to said rotor and extending radially outwardly from the floor surface of the respective annular chamber and being in sliding contact with the inner stator surface; the second partition in said middle annular chamber being offset 180° with respect to the second partitions in said outer annular chambers, respectively.

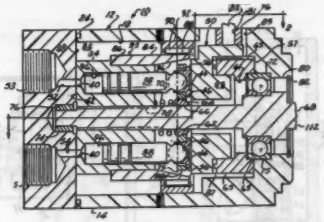
3,991,658
FLUID DEVICE HAVING SINTERED METAL COMPONENTS

Wilfred S. Bobier, 4518 Brightmore, Bloomfield Hills, Mich. 48013

Continuation of Ser. No. 264,540, June 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 60,333, Aug. 3, 1970, Pat. No. 3,739,591. This application July 11, 1974, Ser. No. 487,771

Int. Cl.² F01B 13/04

U.S. Cl. 91—505 **7 Claims**



1. A fluid pressure energy translating device of the axial piston type comprising:

a housing;

a cylinder barrel rotatably mounted within said housing;

said cylinder barrel having a plurality of arcuately spaced cylinder bores communicating with both longitudinal ends of said cylinder barrel;

a plurality of pistons with inner ends disposed for reciprocal stroking movements within said cylinder bores;

a valve face having passage means, said valve face and one end of said cylinder barrel being disposed for relative rotary movement with said cylinder bores communicating successively with said passage means in said valve face; and

an inclined thrust plate means constructed of a sintered metal material mounted in said housing, said thrust plate having a piston engaging surface drivingly engaging the other ends of said pistons for imparting a reciprocal stroking movement to said pistons within said cylinder barrel as said cylinder barrel rotates, said piston engaging surface of said thrust plate is hardened to a predetermined depth, said inclined thrust plate means is formed from a powdered iron and copper mixture pressed to a density between 6.2 and 6.8 grams per cubic centimeter.

3,991,659
FAIL SAFE APPARATUS FOR LOAD LIFTS

Morris D. Robinson, 1509 W. 132nd St., Gardena, Calif. 90249

Filed Dec. 6, 1973, Ser. No. 422,611

Int. Cl.² F15B 15/22

U.S. Cl. 92—9 **8 Claims**

1. In a hydraulic power mechanism having frame means and means presenting a load to be overcome, the combination of:

a hydraulic actuator connected between said frame means and said means presenting a load; and

a rate of flow responsive fail-safe valve device connected between said frame means and said means presenting a load, said fail-safe valve device comprising:

a cylinder and a piston cooperatively defining a pair of hydraulic chambers one on each side of said piston containing hydraulic fluid;

a passageway between the inner surface of said cylinder and the outer periphery of said piston to permit limited flow

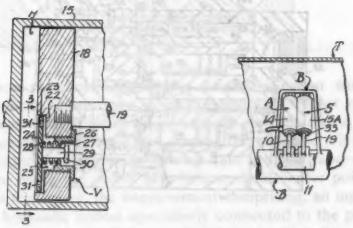
of fluid, trapped in one of said chambers, through said passageway;

said cylinder and piston being so arranged relative to said mechanism as to enlarge said one chamber during actuation of said hydraulic actuation to overcome said load;

said fail-safe device including:

a valve plunger, said plunger including a movable flat disc and a central stem;

stop means on said plunger for limiting axial movement of said plunger, said piston having an off-center bore therethrough receiving said stem and said stop means, said bore containing a stop element therein for engagement by said stop means, said piston having a counterbore concentric with and larger than said bore for receiving said disc, said counterbore defining a valve seat for said disc; and



resilient means in said bore for biasing said disc away from said valve seat to provide an open valve; and

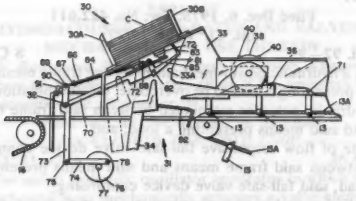
wherein a fluid path is provided between said disc and said counterbore, between said stem and said bore and stop element, and between said bore and said stop means through which said fluid may escape from said one chamber in return flow during normal return movement of the mechanism, and through which the escape of fluid from said chamber is reduced when the mechanism exceeds a predetermined rate of return movement and the force of said spring is overcome to permit said disc to seat in said counterbore, said limited flow being less than the flow through said path during normal movement of the mechanism and being greater than the flow through said path when the mechanism exceeds said predetermined rate of return movement.

3,991,660

CARTON EXPANDER

Rodney K. Calvert, Dunwoody, and Charles Rabun Landrum, Doraville, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Apr. 15, 1975, Ser. No. 568,243
Int. Cl.² B31B *1/76*
U.S. Cl. 93—53 SD **10 Claims**



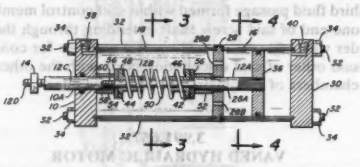
1. A machine for sequentially manipulating collapsed preglued apertured sleeve type cartons out of a hopper and into set-up open ended condition for loading through the open ends thereof, said machine comprising a main feeder arm for sequentially withdrawing the cartons from the hopper, and a supplementary feeder arm arranged to project through an aperture in a lower carton wall to engage an upper carton wall thereby to disrupt any adhesive bond between said upper and said lower carton walls so as to facilitate setting up of the collapsed cartons into open ended condition.

3,991,661

THREE POSITION FLUID POWERED ACTUATOR

William J. Mocha, Tulsa, Okla., assignor to Air Power Systems Company, Inc., Tulsa, Okla.

Filed July 21, 1975, Ser. No. 597,516
Int. Cl.² F01B *31/00*
U.S. Cl. 92—131 **1 Claim**



1. A three position fluid actuator comprising:

a cylinder having a first end plate and a second end plate, the first end plate having an axial opening therein and the cylinder having an intermediate plate having an axial opening therein;

a piston reciprocally positioned within said cylinder and between the intermediate plate and said second end plate;

a piston rod affixed coaxially to said piston and reciprocally extending through said opening in said intermediate plate and sealably through said opening in said first cylinder end plate, said cylinder having a first fluid passage in said first end plate and a second fluid passageway in said second end plate whereby when fluid pressure in said first passageway is greater than in said second passageway, said piston tends to move toward said second cylinder end plate and vice versa, fluid moving between said first passageway through said fluid passages in said intermediate plate;

a piston rod having a reduced diameter portion intermediate said first cylinder end plate and said intermediate plate, the reduced diameter portion forming spaced shoulders on said piston rod;

a pair of spring followers slidably received on said piston rod reduced diameter portion, the followers engaging said piston rod shoulders;

tubular spacers received on said piston rod, one such spacer being positioned between said cylinder first end plate and one of said followers and the other said spacer being slidably received on said piston rod between said intermediate plate and said other of said followers;

a spring compressibly extending between said followers urging said followers into contact with said spacers to normally and positively position the piston in an intermediate position, said piston being movable away from said intermediate position when the fluid pressure of one of said fluid passageways exceeds the fluid passage in the other of said fluid passageways, the spring returning the piston to said intermediate position when differential fluid pressure on said piston is removed; and

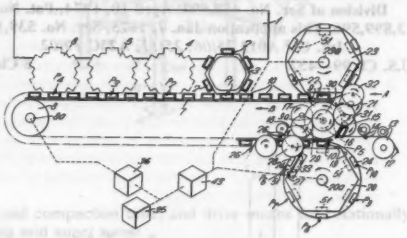
washers, each having an axial opening therein, each washer slidably receiving a portion of said reduced diameter portion between said spacers and said adjacent followers, the thickness of the washers providing means of selecting the length of stroke of the piston from its intermediate position.

3,991,662

PACKING MACHINES

Robert William Davies, London, England, assignor to Molins Limited, London, England

Division of Ser. No. 367,054, June 4, 1973, Pat. No. 3,911,643.
This application July 18, 1975, Ser. No. 597,272
Claims priority, application United Kingdom, June 8, 1972, 26900/72
Int. Cl.² B31B *1/30, 15/26*
U.S. Cl. 93—12 C 15 Claims



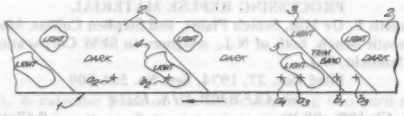
1. Apparatus for making packets comprising a plurality of packet-making devices, each device comprising means for receiving packet blanks in succession and means for subjecting each blank in turn to a sequence of folding and sealing operations to form an open-ended packet; blank feeding means for feeding blanks along separate paths from a common source to all said packet-making devices, said blank feeding means being adapted to cause blanks to be conveyed along each of said paths in rotation; a plurality of packet-transferring devices, one associated with each packet making device; and conveyor means for receiving said open-ended packets from each of said packet-transferring devices, said packet-transferring devices being arranged in succession in spaced positions along part of said conveyor means so that said conveyor passes each of said packet-transferring devices in turn.

3,991,663

OBSERVATION OF MOVING WEBS

Francis Goff Glasby, Chesterfield, England, assignor to Robinson & Sons Limited, Chesterfield, England

Filed Oct. 7, 1974, Ser. No. 512,602
Claims priority, application United Kingdom, Oct. 11, 1973, 47523/73
Int. Cl.² B31C *3/00*
U.S. Cl. 93—94 R 10 Claims



5. In the method of manufacturing tubular container bodies bearing patterns in register with the ends thereof, the steps comprising

helically winding a strip or web bearing along its length a regularly repeated complex variegated pattern and a plurality of at least two spaced separate control features spaced lengthwise along the web,

observing continuously by means of at least two photoelectric cells the moving web before said winding,

causing substantially simultaneous observations of different control features by different cells as said plurality of control features move past said cells,

causing activation of an electric circuit in which said cells are connected only when said substantially simultaneous observation occurs,

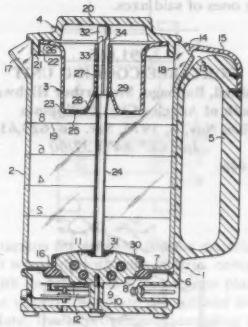
and causing said circuit activation as effectuated by said substantially simultaneous observations to initiate an operation associated with the cutting of the web.

3,991,664

COFFEEPOT

Hajime Yamato, Port Washington, N.Y., assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 31, 1973, Ser. No. 411,361
Claims priority, application Japan, Feb. 13, 1973, 48-18079
Int. Cl.² A47J *31/04*
U.S. Cl. 99—310 2 Claims



1. A coffeepot comprising:

a container for receiving water having a detachable cover;

a tube extending vertically within said container;

a valve located within said container at the lower end of said tube;

a basket for receiving ground coffee removably mounted on and supported by said tube, said basket having a tapered recess portion therein for insertion of the upper end of said tube; and

a pillar-shaped plastic guide closely fitted into the upper end of said tube, said guide having its outer surface in contact with the internal surface of said tube so as to be fixedly supported by the upper end of said tube, and being provided with a finite number of longitudinally extending grooves extending from the upper end of said tube and above said basket, each groove being curved upwardly and outwardly adjacent the upper end of said guide, whereby water boiled out from said tube is widely sprinkled throughout the basket area containing said ground coffee.

3,991,665

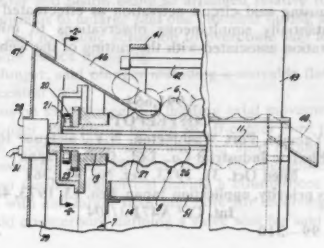
MEATBALL COOKER

Nils Lang-Ree, Los Altos, Calif.; Kurt Nilsson, Bjuv, Sweden; Goeran Hemborg, Aengelholm, Sweden, and Winje Green, Helsingborg, Sweden, assignors to N.P.I. Corporation, Burlingame, Calif.

Filed June 23, 1975, Ser. No. 589,700
Int. Cl.² A47J *37/04*
U.S. Cl. 99—441 3 Claims

1. A meatball cooker comprising a frame, a pair of generally cylindrical rollers each having an axis, means for mounting said rollers on said frame with said axes parallel and horizontal, means defining a helical groove concentric with said axis on at least one of said rollers, said groove having substantially

the same arcuate cross-sectional contour as a portion of a substantially spherical meatball, means within said rollers for



heating said rollers, and means for rotating said rollers about the respective ones of said axes.

3,991,666

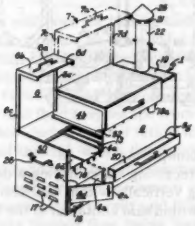
PORTABLE COOKING UNIT

William F. Tidwell, Balibago, MacArthur Highway, and Lucila M. Cobb, both of Angeles City, Philippines

Filed Nov. 6, 1975, Ser. No. 629,612

Int. Cl.[2] A47J *37/00*

U.S. Cl. 99—446 **9 Claims**



1. A portable cooking unit comprising a generally rectangular encloseable metal shell having one end portion of greater height than the opposite end portion, said opposite end portion comprising a barbecue section having means to provide direct heat to food and first grill means to support food over said heating means; said one end portion comprising an oven section to cook food by heated air or smoke from said barbecue section, said oven section having a second grill means in the upper half of said oven section to support food to be cooked in said oven by said heated air or smoke; said oven section and said barbecue section being separated by a pair of vertically-spaced interior walls positioned in the same vertical plane within said shell and interconnecting the front and back walls of said shell, said spaced walls providing lateral means between said barbecue section and said oven section for said flow of said heated air or smoke into and through said oven section; said barbecue section and said oven section each having an opening in the upper portion of the front wall of their respective sections to provide lateral access to food being cooked in each section, the lower edge of each said opening having a plurality of vertical openings to receive skewers; each of said barbecue and oven sections having a hinged cover with a depending front plate which closes each respective access opening when said covers are lowered, said front plates also coacting with said skewer receiving means to prevent said skewers from turning; said first and second grill means each comprising a pair of spaced horizontally-opposed angle bars mounted on the interior surfaces of the front and back walls of said shell, the first grill means being below the second grill means, and extending the length of said wall as supports for food-supporting grills, at least one of said grill supports being positioned within said shell whereby the grill thereon may be slidably moved back and forth between said oven section and said barbecue section; said unit further having smoke exhaust means extending upwardly from the oven section adjacent said oven section cover.

3,991,667

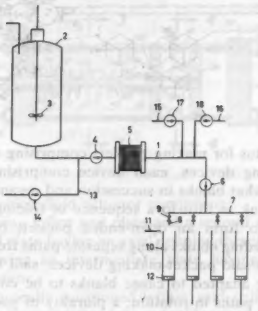
APPARATUS FOR THE MANUFACTURE OF CHEESES

Pierre Stenne, Lozon, France, assignor to Claudel S.A., Courbevoie, France

Division of Ser. No. 459,594, April 10, 1974, Pat. No. 3,899,596. This application Jan. 7, 1975, Ser. No. 539,178

Int. Cl.[2] A01J *25/06, 25/11;* **A23C** *19/02*

U.S. Cl. 99—452 **5 Claims**



1. An apparatus for the production of cheese comprising

at least one vertical chamber for receiving a batch of renneted liquid containing protein constituents of milk,

a means displaceably mounted relative to said vertical chamber in a lower end of said chamber for upward movement in said vertical chamber to displace a coagulated mass of the renneted liquid upwardly under a uniform distributed pressure, and

a cutting unit arranged at the head of said chamber for cutting in a plane perpendicular to the axis of said chamber to cut a slab of coagulum from the coagulated mass of a cheese.

3,991,668

SHREDDER-COMPACTOR APPARATUS FOR PROCESSING REFUSE MATERIAL

Kenneth E. De Milt, Scotch Plains, and Stephen Collins, Monmouth Beach, both of N.J., assignors to SFM Corporation, Plainfield, N.J.

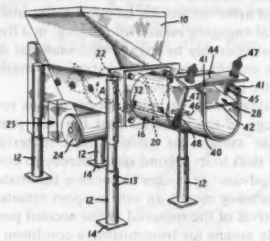
Filed Dec. 27, 1974, Ser. No. 536,809

Int. Cl.[2] B30B *1/18, 15/14*

U.S. Cl. 100—98 R **9 Claims**

1. An apparatus for shredding and compacting refuse material comprising: a hopper for receiving therein refuse material to be shredded and compacted; a compaction tube connected to and in communication with said hopper; a rotary auger screw extending along said hopper and into said compaction tube, said auger screw having a helical flight operative in response to rotation of said auger screw to advance the refuse material from said hopper through said compaction tube while effecting compaction of the material during its advancement through said compaction tube; means disposed within said hopper and coacting with said auger screw for breaking and shredding the refuse material in response to rotation of said auger screw; means on said auger screw disposed at the region

where said auger screw enters said compaction tube for facilitating entry of the shredded and partly compacted material



into said compaction tube; and drive means for rotationally driving said auger screw.

3,991,669

CALENDER PRESSES

David Charles Cumbers, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England

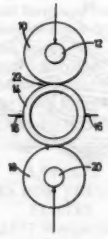
Filed Jan. 14, 1974, Ser. No. 432,991

Claims priority, application United Kingdom, Jan. 17, 1973, 2394/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² B30B *3/04*

U.S. Cl. 100—162 B **28 Claims**



1. A calender press or the like comprising two hard-surfaced cooperating rolls having substantially parallel axes and arranged to define a nip therebetween, at least one of said rolls being a hollow cylinder provided with means locating it with respect to the other roll and with means engaging and supporting it at least substantially along the length of the nip and urging it toward the other roll to generate a desired nip pressure in the nip, the diameter and wall thickness of said hollow cylinder being such that said hollow cylinder is elastically deformable by bending or by squashing or both and thereby accomodates distortions in said other roll or variations in thickness of sheet material passing through the nip to reduce variations in nip pressure along the length of the nip, the radius, R, and the wall thickness, *t*, of the hollow cylinder having the limits

$$Rt^{-2} \geq 13$$
$$Rt^{1/2} \leq 40$$

where

R and t are in millimeters.

3,991,670

APPARATUS FOR BALING FIBROUS MATERIAL

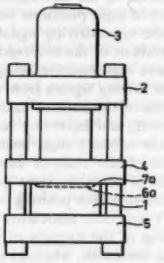
Nils-Erik Stromberg, Sundsvall, Sweden, assignor to Sunds Aktiebolag, Sundsvall, Sweden

Continuation of Ser. No. 348,692, April 6, 1973, abandoned. This application June 19, 1975, Ser. No. 588,342

Claims priority, application Sweden, Apr. 25, 1972, 5399/72

Int. Cl.² B30B *15/06*

U.S. Cl. 100—295 **1 Claim**



1. In an apparatus for pressing fibrous material into a bale for subsequent wrapping with wire or strip, comprising a bale press stand, with an upper and a lower press plate and means for moving the upper press plate toward and away from the lower press plate, the improvement according to which the pressure-applying face of said upper press plate is constituted by a planar border surface normal to the direction of pressing movement of said plate and a centrally located projecting portion, said projection having a height of from 10 to 50 mm., for effecting a permanent depression centrally in the top surface of a bale in order to facilitate the gripping and lifting of a wire or strip which is wrapped around a number of such bales.

3,991,671

DYNAMICALLY DRIVEN PRINTER

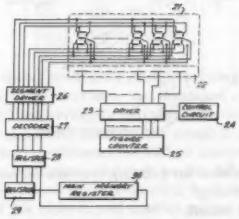
Susumu Aizawa, Suwa; Yoshikiyo Futagawa, Okaya, and Katsumi Kuriya, Matsumoto, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo and Shinshu Seiki Kabushiki Kaisha, Suwa, both of, Japan

Continuation of Ser. No. 384,867, Aug. 1, 1973, abandoned. This application Apr. 21, 1975, Ser. No. 569,624

Claims priority, application Japan, Aug. 2, 1972, 47-77417

Int. Cl.² B41J *7/70*

U.S. Cl. 101—93.04 **12 Claims**



1. A dynamically driven printer for use with a device having a main memory register means and means for periodically reading from said main memory register means at a predeter-

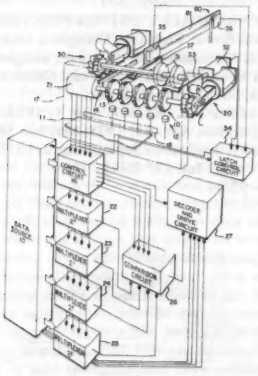
mined frequency, comprising print means; and means coupling said main memory register means and said print means for intermittently applying the contents of said main memory register means to said print means at said predetermined frequency, said print means being adapted to effect printing in response to the signals applied thereto by said coupling means in response to the contents of said main memory register means, said print means including a plurality of digit positions each including a plurality of segment printing devices connected to said coupling means, selected combinations of said segment printing devices at each digit position, when energized, producing selected characters for printing, each of said segment printing devices including a ferromagnetic pin, an X-axis coil and a Y-axis coil, each said coil having a first and second terminal, each digit position including a rectangular array of said segment printing devices aligned along X and Y axes, the first terminal of the corresponding lines of X-axis coils of the respective digit positions being electrically connected to receive the same driving signals from said coupling means, the first terminals of the corresponding lines of Y-axis coils of the respective digit position being connected together to receive the same driving signals from said coupling means; the second terminals of the coils of each digit position being commonly connected, and including means coupled to the common connection of each digit position for sequentially closing the circuits of the coils of each digit position, the ferromagnetic pins of each segment printing device being selectively displaced to effect printing upon the energization of the X-axis and Y-axis coils associated with that pin and the simultaneous closing of the circuits of the coils of the digit position associated therewith, whereby printing is effected in response to the contents of said main memory register.

3,991,672

LINE PRINTER FOR PRINTING INFORMATION ON TICKETS

Stephen G. Keith, Derry, N.H.; Charles J. Casey; Edward F. Burke, Jr., both of Reading, Mass., and John L. Apostoles, Manchester, N.H., assignors to MFE Corporation, Salem, N.H.

Filed Apr. 25, 1975, Ser. No. 571,857
Int. Cl.² B41J *9/38*
U.S. Cl. 101—99 **11 Claims**



1. A line printer for printing symbols on material, said line printer comprising:

A. support means,

B. printing means on said support means for printing symbols on the material,

C. guide means on said support means for receiving one end of the material and guiding the material to said printing means, the material being guided past a first position to a second position along said guide means,

D. material advancing means on said support means spaced between the first and second positions along said guide means for advancing the material past said printing means, said material advancing means including

i. material drive means for advancing the material, and

ii. material engaging means for causing, in a first state, the material operably to engage said material drive means and for enabling, in a second state, the material to pass freely by said drive means,

E. first sensing means on said support means responsive to the passage of the material past the first position along said guide means for causing said material engaging means to shift to its second state thereby to condition said material advancing means to receive the material,

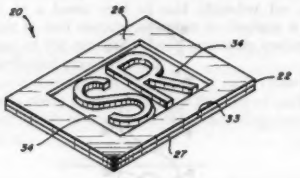
F. second sensing means on said support means responsive to the arrival of the material at the second position along said guide means for transmitting a condition signal, said first sensing means responding to said second sensing means by causing said material engaging means to shift to its first state thereby to condition said material advancing means to advance the material.

3,991,673

NONFABRIC ENGRAVING BLANKET

Thomas E. Coale, Pensacola; Sidney W. Gunn, Cantonment; Frank Merrigan, and Donald M. Tompkins, both of Pensacola, all of Fla., assignors to St. Regis Paper Company, New York, N.Y.

Division of Ser. No. 277,281, Aug. 2, 1972, Pat. No. 3,818,832.
This application July 30, 1973, Ser. No. 383,556
Int. Cl.² B41N *1/12*; B32B *31/20*; C09J *5/02*
U.S. Cl. 101—395 **3 Claims**



1. An engraving blanket consisting essentially of an engraveable layer of relatively live resilient material of a rubber composition and having a printing face and a stripping face, a base layer of relatively nonhard, nonresilient material compatible for vulcanization with the material of the engraveable layer and being of a rubber composition and having a stripping face, said stripping face of said engraveable layer and said stripping face of said base layer being contiguous to each other and being vulcanized together, a small, but effective, amount of talcum powder of on the order of one-fourth gram for each square yard evenly dispersed between said stripping face of said engraveable layer and said stripping face of said base layer and controlling the degree of attachment of vulcanization between said engraveable layer and said base layer, selected portions of said engraveable layer being removed from said base layer at said stripping faces thereby forming a selected printing design in said printing face.

3,991,674

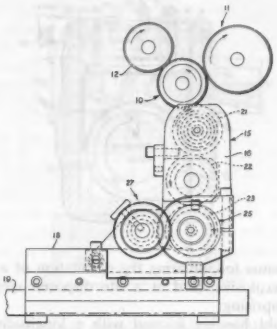
DAMPENING APPARATUS FOR A LITHOGRAPH OFFSET PRINTING PLATE

Nello J. Petri, 2140 Jones St., San Francisco, Calif. 94133

Continuation-in-part of Ser. No. 126,082, March 19, 1971, abandoned, and a continuation-in-part of Ser. No. 274,648, July 24, 1972, abandoned. This application Sept. 11, 1973, Ser. No. 396,206

Int. Cl.² B41F 7/26, 7/36, 7/40

U.S. Cl. 101—148 1 Claim



1. In a device for applying dampening fluid to the plate of a lithographic press:

an inking roller power driven from said plate,

a fluid transfer roller,

a form roller peripherally driven by friction from said inking roller and in rolling engagement with said transfer roller,

a reservoir for fluid,

a pan roller adapted to receive fluid from said reservoir, and an intermediate roller interposed between and in rolling engagement with said pan roller and said transfer roller,

independent driving means for driving said pan roller independently of said plate, form and transfer rollers,

a pair of gears on said form and transfer rollers respectively for driving said transfer roller from said form roller at the same surface speed, and

an overrunning clutch interposed between said form and transfer rollers to permit said form roller to gear drive said transfer roller and preventing said transfer roller from gear driving said form roller.

3,991,675

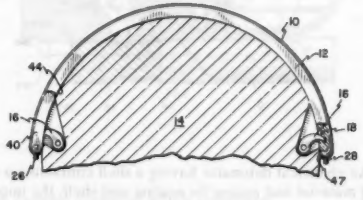
CLAMPING SADDLES FOR THIN FLEXIBLE PRINTING PLATES

Fred W. Standiford, 22577 Margarita Drive, Woodland Hills, Calif. 91364

Filed Apr. 1, 1971, Ser. No. 130,090

Int. Cl.² B41F 13/10

U.S. Cl. 101—415.1 10 Claims



1. A clamping device for securing a thin flexible printing plate to a rotary printing press having a rotatable cylinder, said clamping device comprising:

a semi-cylindrically shaped saddle plate having opposed concave and convex faces and first and second longitudinally extending side edges, and adapted to be secured with its concave face flush against the surface of said cylinder of said rotary press with said first and second side edges substantially parallel to the axis of said cylinder while supporting said thin flexible printing plate on the convex face of said saddle plate;

securing means attached to and positioned along the first side edge of said saddle plate for securing a first edge of said thin flexible plate to said saddle plate;

a support member journaled to and positioned along the second longitudinally extending side edge of said saddle plate;

a plurality of outwardly extending register pins secured to said support member and positioned to coact with register pin openings formed along a second edge opposite said first edge of said thin flexible plate;

hand operated rotation means secured to said support member at one end of said support member for rotating said support member in the support member journals; and

a recess formed in said saddle plate proximate said second longitudinally extending side edge and sized to receive a handle therein, said rotation means comprising a handle fixedly secured to said support member at one end thereof and sized to be received substantially entirely within said recess.

3,991,676

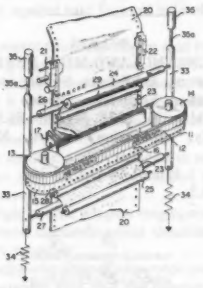
HIGH SPEED PRINTER WITH MULTICOLOR INK RIBBON

Rentaro Sasaki, Takasaki, Japan, assignor to Oki Electric Industry Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 360,123, May 14, 1973, abandoned. This application Mar. 6, 1975, Ser. No. 555,849

Int. Cl.² B41F 31/16

U.S. Cl. 101—102 8 Claims

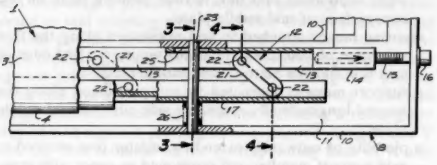


1. For a high speed multicolor printer printing lines which extend in a horizontal direction, the invention comprising a continuous ink ribbon vertically movable with respect to said printer and having a width substantially equal to the width of said print lines, said continuous ink ribbon comprising a plurality of adjoining horizontal ink bands having different colors, said different colored ink bands extending horizontally across the width of said ink ribbon, and control means to vertically move said ink ribbon a selected amount to move a selected one of said adjoining different colored ink bands to a printing position whereby a printing line can be printed in a selected one of said different colors.

3,991,677
PRINTING SCREEN AND TENSIONING MEANS

Vincent H. Barnes, 1322 Linda Rosa St., Los Angeles, Calif. 90021

Filed Apr. 17, 1975, Ser. No. 569,141
Int. Cl.² B41F 15/36
U.S. Cl. 101—127.1 7 Claims

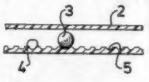


4. A printing screen and tensioning means, comprising:
a. a printing screen having a central printing area bordered by marginal areas;
b. a frame structure having sides overlying the marginal areas and having coplanar lower edges engaging the marginal areas;
c. a parallelogram structure carried by each of selected sides of the frame structure;
d. each parallelogram structure including a tension bar, extending lengthwise with respect to each selected side of the frame structure, and cross pins extending crosswise thereto for guiding the tension bar to and from the corresponding marginal area of the printing screen;
e. each parallelogram structure also including a drive bar extending parallel to the tension bar, means for guiding the drive bar in a direction lengthwise of the tension bar, and link members joining the drive bar and tension bar to effect uniform movement of the tension bar to and from the corresponding marginal area of the printing screen upon lengthwise movement of the drive bar;
f. attachment means joining the tension bar to the corresponding marginal area of the printing screen;
g. and an operating member extending from the drive bar and carried by the frame structure to cause lengthwise movement of the tension bar to effect uniform stretching of the printing screen.

3,991,678
MAGNETIC LAND MINE DEVICE

Sven William Bjelvert, Eskilstuna, Sweden, assignor to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Mar. 31, 1975, Ser. No. 563,512
Claims priority, application Sweden, Mar. 29, 1974, 7404243
Int. Cl.² F42B 23/26
U.S. Cl. 102—19.2 4 Claims

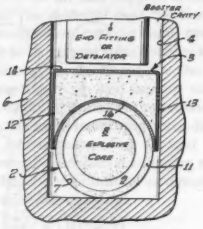


1. A device capable of detonating a magnetic land mine upon removal of same from the ground, comprising, in combination, a stationary magnetic field sensing device, a stationary annular tube located substantially in a horizontal plane in the vicinity of said magnetic field sensing device, a magnetized ball disposed in said tube for rolling movement therein upon the tilting of said tube out of said horizontal plane to operatively condition said sensing device, means in said tube engageable by said ball for retaining said ball against said rolling movement when said tube is subjected to vibrations of a limited magnitude.

3,991,679
BOOSTER APPARATUS FOR AUGMENTING SIDE INITIATION OF EXPLOSIVE CORDS

Jacob Savitt, Capitola, and William Campbell Morgan, San Jose, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 23, 1975, Ser. No. 589,482
Int. Cl.² C06C 5/06
U.S. Cl. 102—27 F 8 Claims

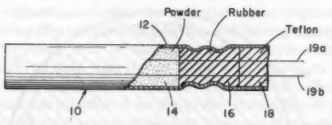


1. Apparatus for initiating the detonation of a continuous length of explosive cord at a site disposed medially of its length, comprising:
a manifold housing formed with a longitudinal opening having inner and outer end portions and with a second opening extending transversely of and intersecting said first opening, said cord length being run through said second opening,
a donor charge disposed in the outer end portion of said first opening, and
a booster charge disposed between said donor charge and said cord,
said booster charge having an outer end wall disposed in close proximity with said donor charge and an inner end wall having an arcuate extent disposed in substantially continuous contact with a major peripheral extent of the outwardly-facing circumferential portion of said cord,
said donor charge detonating said booster charge to focus its explosive force into said cord throughout said major peripheral extent.

3,991,680
TAGGING EXPLOSIVES WITH SULFUR HEXAFLUORIDE

Russell N. Dietz, Shoreham; Edgar A. Cote, Yaphank; William Vogel, East Islip, all of N.Y., and John C. Dempsey, Frederick, Md., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 15, 1975, Ser. No. 577,822
Int. Cl.² F42C 19/12
U.S. Cl. 102—28 R 5 Claims



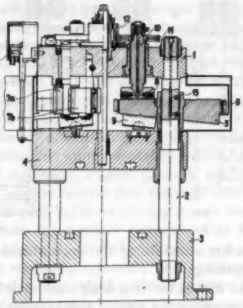
1. An electrical detonator having a shell containing a detonating material and means for sealing said shell, the improvement comprising a source of SF_6 within said shell, said source releasing said SF_6 over a period of time.

3,991,681

DISC TYPE PRESS WITH HYDROSTATIC BEARINGS

Jerzy Antosiak, Warsaw, Poland, assignor to Osrodek Badawczo-Rozwojovy Obrobky Plastycznej Metali "Plasomet", Warsaw Ul. Cracklego, Poland

Filed May 8, 1975, Ser. No. 575,962
Claims priority, application Poland, May 22, 1974, 171314
Int. Cl.[2] B30B 1/26
U.S. Cl. 100—257 6 Claims



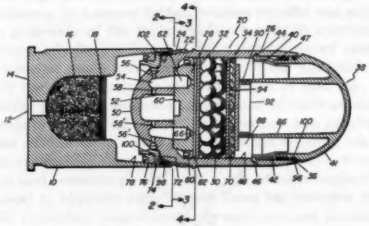
1. A disc type power press comprising a table, columns on said table, a head on said columns, a ram displaceably mounted on said columns, at least one rotatable driving disc of wedge shape, bearing means supporting said disc on a respective column for rotation and axial displacement, upper and lower opposed slipper pads, a threaded member screwed into said head and having a lower end carrying said upper slipper pad, said lower slipper pad being mounted on said ram with the wedge shape driving disc interposed therebetween in contact with the slipper pads, and a drive means for said threaded member to advance or retract the same in said head thereby to displace the upper slipper pad correspondingly.

3,991,682

CANISTER CARTRIDGE AND PROJECTILE ASSEMBLY WITH RELEASABLE NOSE

Vaughn E. Peak, Fullerton, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,207
Int. Cl.[2] F42B 5/02
U.S. Cl. 102—38 5 Claims



1. A canister cartridge which comprises:

a cup shaped cartridge member having a partially closed rear end and an open forward end;

a primer axially disposed in the rear end of said cartridge member;

charge means, for generating gas pressure which includes;

a propellant axially disposed in said cartridge member and aligned with said primer and in contact therewith; and

a circular cardboard wad transversely positioned within said cartridge member, said wad holding said propellant in said rear end of said cartridge member;

sabot means, releasably disposed in the forward end of said cartridge member, for holding therein and dispensing therefrom a payload which includes;

a hollow body member having a cup shaped partially closed rear end and a forward open end, said rear end having an exteriorally formed circumferential shoulder thereon and a molded open ended tube centrally disposed therein, said body member having an annular gas cavity axially aligned with and exterior to said open ended tube, said rear end having a first pair of flow passages extending through the rear wall of said rear end, said first pair of passages communicating with said annular gas cavity, a second pair of flow passages passing through said open ended tube which communicate with the interior of said open-ended tube, a circumferentially disposed sabot "O" ring groove positioned in the exterior wall of said sabot rear end, and a circumferential sabot pawl groove positioned in the interior wall of the forward end of said body member;

piston means for controlling therethrough the flow of gas generated by said charge means and for expelling said payload from said sabot means which includes;

a piston member having a rear side and a forward side, a circumferential shoulder disposed around the periphery of said piston member, said rear side being provided with an enlarged concentric channel aligned and communicating with said annular gas cavity of said body member, said forward side having a plurality of radially extending grooves therein, a pair of piston gas flow passages transversely disposed in said piston member intermediate said forward side and said enlarged concentric channel permit gas generated from said propellant to flow from said enlarged concentric channel to said forward side of said piston member;

a first disc shaped member positioned in said body member which abuts against said forward side of said piston member;

a plurality of metal shot disposed in said body member, said shot abutting against said first disc member;

a second disc shaped member positioned in said body member so that it abuts against said plurality of metal short, said second disc holding said metal shot intermediate said first and second disc members;

a disc shaped flexible pad positioned in said body member intermediate said second disc shaped member and said nose cone means;

a free fitting rigid plastic adaptor ring operatively positioned on said formed circumferential shoulder of the rear end of said body member;

a first rubber chevron shaped obturator positioned intermediate said adaptor ring and the interior wall of said cup shaped cartridge member;

a second chevron shaped rubber obturator positioned in said piston shoulder; and

an "O" ring seal operatively positioned in said sabot "O" ring groove intermediate the exterior wall of said body member and the interior wall of said cartridge member; and

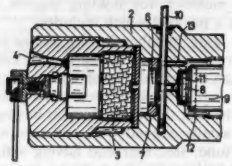
releasable nose cone means for providing moisture protection for the interior of said sabot means and for said charge means, and means for sequentially releasing said nose cone means from said sabot means after set-back acceleration so that said nose cone means can move forwardly away from said sabot means.

3,991,683

SAFETY DEVICE FOR PROJECTILES

Max Rentzsch, Furth, and Günther Hofmann, Nurnberg, both of Germany, assignors to DIEHL, Nurnberg, Germany

Filed Jan. 30, 1973, Ser. No. 328,127
Claims priority, application Germany, Feb. 2, 1972, 2204823
Int. Cl.[2] F42B 15/10
U.S. Cl. 102—49.6 2 Claims



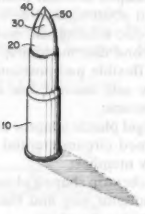
1. In a projectile, a first chamber having a propellant charge, a second chamber separated from the first chamber by a wall and having a detonator therein adjacent said wall, a firing pin extending through the wall and subject to pressure of the explosion of said propellant charge to move it to actuate said detonator so as to be detonated by said firing pin upon movement by the pressure of the explosion, a safety member blocking movement of said firing pin toward said detonator and removable to allow such movement, and a disc of heat resistant material covering the side of said detonator toward said firing pin and preventing hot gases which pass by said pin from contacting the side of said detonator facing said pin, said disc being elastic to allow impact of said firing pin to detonate said detonator.

3,991,684

BONE PIERCING HUNTING BULLET

Dennis S. Pritchard, Apo, Md., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,324
Int. Cl.[2] F42B 11/00
U.S. Cl. 102—92.2 1 Claim



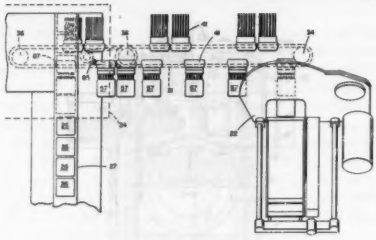
1. A bone piercing hunting bullet, comprising:
a lead bullet,
a copper jacket surrounding a lower portion of the bullet,
a first V shaped ogive segment steel tip,
a second V shaped ogive segment steel tip mounted with a base of the second V segment flush with a base of the first V segment, forming an X shaped steel tip assembly with a shear line between the V segments,
the X shaped steel tip assembly mounted in the ogive tip of the lead bullet, whereby the steel tips may continue to penetrate into an animal as the lead tip of the bullet mushrooms in the tissues of an animal.

3,991,685

TRANSFERRING AND ACCUMULATING DEVICE FOR SLICED COMESTIBLE PRODUCTS

Max Edward Toby, San Francisco, Calif., assignor to Toby Enterprises, South San Francisco, Calif.

Filed Feb. 25, 1975, Ser. No. 552,851
Int. Cl.[2] B65G 17/16
U.S. Cl. 104—165 10 Claims



1. A device for transferring and accumulating a plurality of articles, comprising
transfer line means for receiving each article individually,
accumulator means for storing said articles on said transfer line,
said transfer line means including laterally disposed rail means, means supporting a plurality of drive webs translating continuously along said rail means, and a plurality of transfer carriages supported on said rail means, means on said carriages for engaging said drive webs and translating said carriages along said rail means, each transfer carriage including a support bracket pivotally secured thereto and depending therefrom, each support bracket including a laterally extending portion for receiving and supporting said articles.

3,991,686

KNOCKDOWN DISPLAY STAND

James I. Mechachonis, 1100 Poquonock Ave., Windsor, Conn. 06095

Filed July 29, 1975, Ser. No. 599,957
Int. Cl.[2] A47B 41/04
U.S. Cl. 108—28 3 Claims

1. A display stand comprising: a base, a post extending vertically upwardly from said base, said post consisting of a

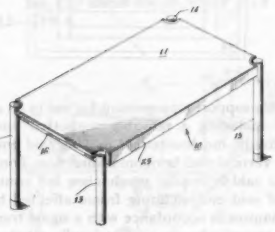
plurality of individual sections arranged end-to-end, joint means defining a slip fit telescopic joint at each pair of adjacent end portions of said post sections for releasably joining said post sections to one another, each of said joint means including a socket part fixed to one of its associated post sections and having a socket opening slidably receiving the other of its associated post sections, a plurality of brackets spaced along the length of said post, each of said brackets having said post passing loosely through it so as to be rotatable and slidable axially of said post, a plurality of means spaced from one another along the length of said post and each providing an upwardly facing support surface fixed relative to said post, each of said brackets further being engaged with and vertically supported by an associated one of said support surfaces, each of said brackets having at least one arm extending horizontally from said post and adapted at its outer end to support an article for display purposes, said base including means defining a socket opening loosely slidably receiving the lower end of the lowermost one of said post sections to provide a slip fit telescopic joint releasably joining said lowermost post section to said base, a table support, said table support consisting of a tubular central part through which said lowermost one of said post sections loosely passes and which part rests on said base for vertical support while being free to rotate relative to said base and said post, and a plurality of arms extending vertically upwardly and outwardly from said central part, and a horizontal table supported by the upper ends of said arms, said table having a central opening through which said post loosely passes.

3,991,687

TABLE WITH FOLDABLE LEGS

Alan C. Burr, East Norwalk, Conn., assignor to Howe Furniture Corporation, New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,132
Int. Cl.² A47B *3/00*
U.S. Cl. 108—132 **9 Claims**



1. A folding table leg construction wherein opposed pairs of table legs are alternatively locked in either a rigid upright position or in a secure folded position parallel and adjacent to the underside of the table top comprising in combination, a substantially flat planar table top, a pair of spaced apart parallel metallic angle members secured to the underside of said table top in proximity to opposite edges of said top, a hinge bracket pivotally mounted on one end of each of said angle members and pivotal about a first common axis parallel to the plane of said table top, a rigid cross bar member secured to both of said hinge brackets and extending therebetween parallel to said common pivotal axis, a pair of table supporting legs secured to opposite ends of said cross bar member and normally extending perpendicular to said common pivotal axis, a dual radius pear shaped bearing opening formed through the opposite ends of each of said parallel angle members and establishing a second pivotal axis parallel to said first pivotal axis, an elongated cylindrical shaft having its opposite ends mounted in said bearing openings and pivotal about said second axis, a pair of protruding members secured to opposite ends of said cylindrical shaft and extending beyond the ends thereof through the the large portion of said pear-shaped bearing opening beyond the outer flanges of said angle members, a pair of rigid elongated eccentric arms having one end of each pivotally mounted to said protruding members and the opposite ends of each said arms mounted to pivot means passing through said angle members and said hinge brackets at said first common axis, and handle means mounted on said cylindrical shaft whereby said shaft and its protruding end members may be rotated from a first off-center locking position through dead center in which said shaft, said protruding end members and said first pivotal axis are in alignment, into a second off-center position in which said eccentric arms unlock said table legs for pivotal movement about said first pivotal axis.

3,991,688

SECURITY DEVICE

Lloyd A. Winters, P.O. Box 131, Benedict, Md. 20612

Filed Jan. 16, 1975, Ser. No. 541,451
Int. Cl.² G08B *15/02*; E05G *1/12*
U.S. Cl. 109—32 **9 Claims**

1. A manually operable device for discharging a deterrent substance on persons engaged in unauthorized acts in close proximity to said device, comprising

a base plate adapted to be mounted in a vertical position on a support means adjacent the area to be protected;

a key lock housing on said base plate covering said plate, said plate having a discharge opening therethrough;

a cartridge holder including an emission port in alignment with said opening through said base plate;

a cartridge containing an explosive charge and a deterrent substance fitted in said holder;

manually operable means for discharging said cartridge, said means comprising a pivoted cartridge impact member, spring means for actuating said impact member to fire said cartridge;

detent means operable to retain the spring means under compression;

a rotary, key-operated means engageable with said detent means and operable to release said detent means when a key is inserted and rotated therein, in one direction, and, further, in engagement with said cover to retain said cover closed when said spring is compressed and during release of said detent means, said key operated means being rotatable in the opposite direction to release said cover.

3,991,689
WASTE GREASE-BURNING SYSTEM

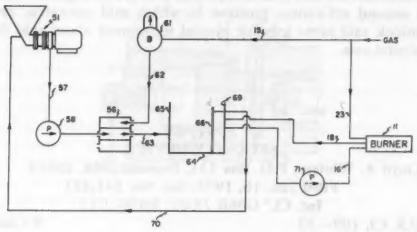
Ulf F. Rinecker, San Francisco, Calif., assignor to Envirotech Corporation, Menlo Park, Calif.

Division of Ser. No. 352,139, April 18, 1973, Pat. No. 3,894,833. This application Apr. 11, 1975, Ser. No. 567,207

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.² F23G *5/02*

U.S. Cl. 110—8 P **6 Claims**



1. A system for conditioning and burning materials such as aqueous mixtures containing organic solids that constitute skimmed floatage from waste-water treatment operations, comprising:

a. Grinder means for first receiving and grinding such materials;

b. A settling device for receiving the ground materials and permitting the same to settle; said settling means including a settling zone, means for receiving a decanted overflow from the settling zone, and a zone for containing said overflow;

c. A burner assembly which receives a flow of material from said overflow containing zone and emits a fraction thereof as a spray which is subsequently burned, said burner assembly including return means for returning a fraction of the flow for subsequent recycling.

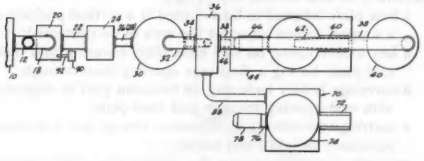
3,991,690
ANTI-POLLUTION ATTACHMENT TO FURNACE

Frank Bork, 1460 W. Victoria, Chicago, Ill. 60611

Continuation-in-part of Ser. No. 384,233, July 31, 1973, abandoned. This application Apr. 4, 1975, Ser. No. 565,054

Int. Cl.² F23J *15/00*

U.S. Cl. 110—119 **8 Claims**



1. Non-scrubbing conservation apparatus for use in combination with a furnace having a flue connected in fluid communication with the atmosphere, comprising:

a first box connected in fluid communication with said flue; and

condenser means connected in fluid communication with said first box for drawing flue gases into said first box and creating a temperature increase in the furnace, including a second box connected in fluid communication with said first box and a blower unit connected in fluid communication with said second box, the gases drawn into said second box being cooled and condensed, said second box including a bottom wall having holes therein to permit passage of the condensate, and first means defining a first chamber having a pair of inlets and a pair of outlets, one of said outlets disposed across from one of said inlets, a blower mounted in said one inlet and pushing cold air into said first chamber, said one outlet discharging cold air from said first chamber, a second blower extending into said first chamber through the other of said inlets and directed to blow through the other of said outlets, second means defining a second chamber having a first inlet connected to said other outlet of said first chamber, a third box, and means connecting said second means in fluid communication with said second and third boxes via said second means, said third box receiving and condensing gases.

3,991,691
MECHANISM FOR ADJUSTABLY POSITIONING AN EMBROIDERING FRAME

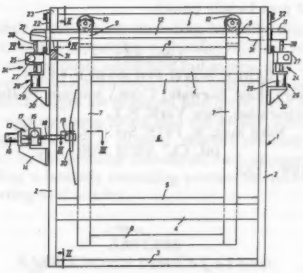
Kurt Bolldorf, Kaiserslautern, Germany, assignor to Pfaff Industriemaschinen GmbH, Kaiserslautern, Germany

Filed Nov. 5, 1975, Ser. No. 629,149

Claims priority, application Germany, Nov. 6, 1974, 2452631

Int. Cl.² D05C *5/00*

U.S. Cl. 112—86 **11 Claims**



1. A movable support arrangement for use in an embroidering machine including a movably supported embroidering frame, a hydraulic mechanism for moving said embroidering frame in the vertical and horizontal direction, control means connected to said hydraulic mechanism for controlling the movement of said embroidering frame effected by said hydraulic mechanism in accordance with a signal transmitted to said control means wherein said hydraulic mechanism comprises a stepping means in direct supporting contact with said embroidery frame for moving said embroidery frame into a selected position in accordance with the signal delivered to said control means and for holding said embroidering frame in the selected position.

3,991,692
BOBBIN THREAD DEPLETION DETECTOR FOR SEWING MACHINE

Reinhold Papajewski, Buchig, and Heinz Emil Walter, Blankeloch, both of Germany, assignors to The Singer Company, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,443

Int. Cl.² B65H *63/02*

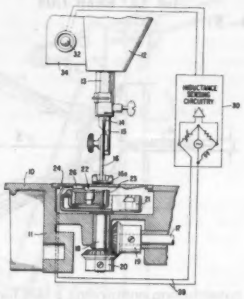
U.S. Cl. 112—218 R **2 Claims**

1. A bobbin thread depletion detector for sewing machines comprising:

a horizontally mounted bobbin having an upper ferro-magnetic flange movably axially along the hub of said bobbin, said movable flange being held in a raised position by thread wound on said bobbin;

an electromechanical sensing coil positioned adjacent the movable flange of said bobbin whereby said movable flange acts as a shunt to said sensing coil;

inductance sensing circuitry coupled to detect changes in the inductance of said sensing coil, due to the movement



of said movable flange having been released by the depletion of said bobbin thread; and

alarm means coupled to said circuitry for signalling the sewing machine operator of inductance changes in said sensing coil.

3,991,693

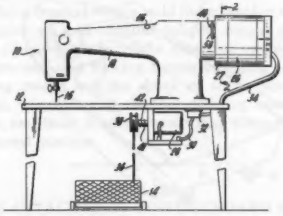
SEWING MACHINE DRIVE CONTROL

Robert J. Moran, Littleton, and Louis P. Marsilia, East Boston, both of Mass., assignors to Clinton Industries, Inc., Hackensack, N.J.

Continuation-in-part of Ser. No. 153,515, June 16, 1971, abandoned. This application June 2, 1972, Ser. No. 259,171

Int. Cl.² D05B *69/26*; H02P *3/12*

U.S. Cl. 112—219 A **5 Claims**



1. A control system for a sewing machine and the like, having drive means connected to a motive source, comprising:

a direct current motor having a low inertial rotor mechanically coupled to the drive means of the machine;

switch means controllable by the operator for providing a stop command;

drive signal means including:

transformer means for developing a variable alternating current signal and manually operable means for controlling the transformer means to vary said alternating current signal and means for converting the alternating current signal into a variable unidirectional current, said drive signal means being disabled by the stop command;

needle position sensing means; and

motor torquing means responsive to the stop command and the needle position sensing means for developing a limited duration torquing signal for driving the motor until the needle reaches a predetermined position when the drive signal means is disabled.

3,991,694

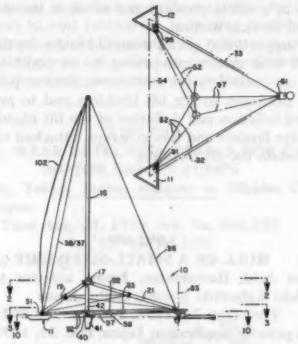
WIND-PROPELLED APPARATUS

Robert Bruce Black, 5525 Sepulveda Court, Concord, Calif. 94521

Division of Ser. No. 285,461, Aug. 31, 1972, Pat. No. 3,831,539. This application Jan. 28, 1974, Ser. No. 438,371

Int. Cl.² B63B *39/00*

U.S. Cl. 114—39 **2 Claims**



1. A wind-propelled craft for transport on a medium, comprising: a pair of spaced transport members and a support member disposed generally at the corners of a triangular configuration, said support member having a downwardly extending fin disposed in the medium for inhibiting sideways movement of said support member; a mast upstanding from said triangular configuration; frame means including stays and spars disposed radially from the foot of the mast and extending from said transport members and support member to the foot of said mast for maintaining said mast upstanding and for maintaining the triangular configuration of said spaced transport and support members; a second fin centrally disposed in the triangular configuration proximate to the mast and extending into the medium for inhibiting sideways movement of the craft; means supporting said second fin for both rotation and translation with respect to the frame means; attachment means pivotally securing the frame means to said support member; a sail operatively connected to the frame means and having corners describing essentially a plane; and means for maintaining said attachment means at a fixed distance from said plane.

3,991,695

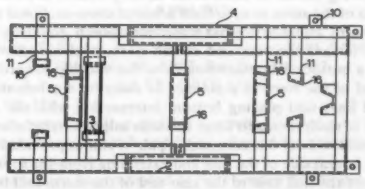
WATERCRAFT DOCKING

Frank W. McDonald, 4420 Choctaw Circle SE., Huntsville, Ala. 35801

Filed Jan. 8, 1976, Ser. No. 647,589

Int. Cl.² B63C *1/02*, *1/06*

U.S. Cl. 114—45 **3 Claims**



1. A floating watercraft dry dock for providing a stable, dry stowage for watercraft in a raised position and an effective watercraft launch in a lowered position, comprising:

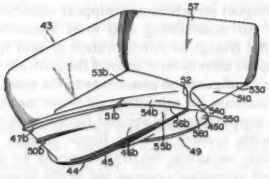
a. a rigid frame supported by a plurality of replaceable lift air bladders which are inflatably controlled,
b. a plurality of flotation bladders mounted on the frame to control the submersion of the dry dock when it is to be lowered to launch a watercraft,
c. a replaceable trimmer bladder mounted on the frame whereby the nonlevel flotation and trim of the dry dock due to an offset center of gravity can be corrected,
d. dry dock guides, attached to the frame, to restrain the dry dock in a stable position and to allow the dry dock required vertical motion,
e. boat supports and guides mounted to the dry dock frame,
f. an air hose system comprising an air control, a take-up reel, air-control valves and connections to provide stabilized pressures to the lift bladders and to provide controlled inflation and deflation of the lift bladders, and
g. bladder fenders and fender straps, attached to the frame to contain the lift bladders.

3,991,696

HULL OF A SMALL-SIZED SHIP

Shigemitsu Aoki, Hamamatsu, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Dec. 23, 1974, Ser. No. 536,002
Claims priority, application Japan, Dec. 29, 1973, 49-1146; Oct. 16, 1974, 49-118887; Oct. 16, 1974, 49-118888
Int. Cl.² B63B 1/04
U.S. Cl. 114—56 **12 Claims**



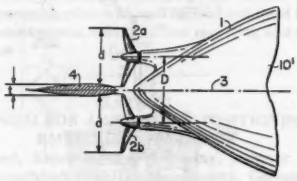
1. A hull for a small-sized ship for travel at relatively lower and relatively higher velocities comprising a stern having a pair of recesses which are provided one at each lateral side of the stern and which extend toward the rear end of the stern beginning from a location rearwardly of midship, each of said recesses being defined by a wall surface, said recesses gradually drawing nearer to each other as they extend toward the rear end of the stern so as to form a lateral cross-sectional area of the stern under a normal water line which gradually decreases toward the rear end of the stern, a planing bottom having a buttock line extending from the midship toward the rear end of the stern in a manner to describe a substantially straight line, said planing bottom intersecting with the wall surface of each recess to form an outer edge therebetween at each lateral side of the stern, and a pair of chines provided one at each lateral side of the hull and extending from the forward section of the hull toward the rear end of the stern, said outer edge being continuously connected with the respective chine to form a continuous rear extension of said chine. each said recess having a depth extending from said outer edge toward the central longitudinal cross-section of the hull.

3,991,697

TWIN-SCREW VESSEL

Kaname Taniguchi, and Kinya Tamura, both of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Oct. 15, 1969, Ser. No. 866,478
Claims priority, application Japan, Oct. 26, 1968, 43-77668
Int. Cl.² B63B 1/08
U.S. Cl. 114—57 **1 Claim**



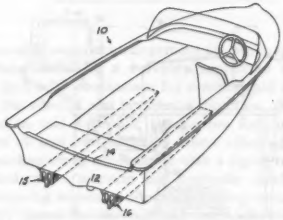
1. A ship construction comprising a hull having a longitudinal central plane with a screw propeller rotatably mounted on an axis symmetrically arranged on each side of said central plane, a rudder aft of said screw propellers arranged on said central plane, said hull being shaped so that it does not protrude aft between said screw propellers, the distance between the axes of said screw propellers being greater than the diameter of each of said screw propellers and being equal to or less than the diameter of each of said propellers plus the thickness of said rudder.

3,991,698

BOAT LIFT

Curtis W. Simpson, 632 SW. 34, Oklahoma City, Okla. 73109

Filed Aug. 14, 1975, Ser. No. 605,110
Int. Cl.² B63B 1/16
U.S. Cl. 114—66.5 R **1 Claim**



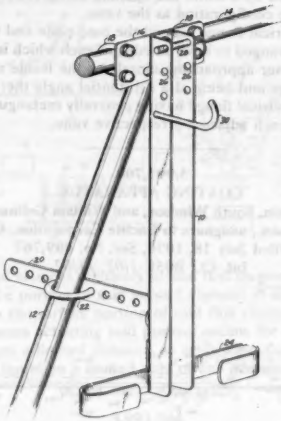
1. A boat lifting device, comprising:
a pair of elongated hollow members each having a planar top panel characterized by an upper surface adapted to longitudinally contiguously contact and be secured to the bottom surface of a boat hull,
said members each having a forward end portion and having a coextensive bottom panel of equal width with its bottom surface spaced below said upper surface throughout the major portion of its length a distance substantially equal to eight-tenths its transverse width and converging toward said upper surface at its forward end portion;
side panels extending between and interconnecting said top and bottom panels for forming a box-shape in transverse section; and,
a substantially coextensive vertical stabilizing fin bisecting each said member and depending beyond the bottom surface of each said bottom panel a distance at least equal to three-tenths the transverse width of said members.

3,991,699

ANCHOR HOLDER

Jacob Bass, 89 Fuller Drive, West Hartford, Conn. 06117

Filed Mar. 18, 1976, Ser. No. 668,194
Int. Cl.² B63B 21/22
U.S. Cl. 114—210 10 Claims



1. An anchor holder comprising:

means defining an elongated open-sided channel, said channel being sized to receive the shank of an anchor;

first connector means mechanically coupled to said channel defining means adjacent a first end thereof for mounting said channel defining means to a rail of a vessel;

second connector means mechanically coupled to said channel defining means intermediate its length for supporting said channel defining means from a vessel stanchion, said second connector means extending outwardly from said channel defining means and being adjustable in length;

anchor fluke bracket means, said fluke bracket means being mountable on said channel defining means and defining a pair of facing anchor fluke receiving openings; and

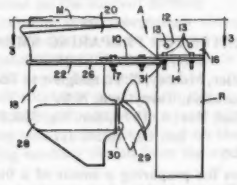
locking means, said locking means engaging said channel defining means and the shank of an anchor positioned therein, whereby said channel defining means, locking means, and fluke bracket means may support an anchor in a stored position.

3,991,700

RUDDER ATTACHMENT FOR OUTBOARD MOTORS

William T. Cleary, 209 Fisher St., and Paul A. Bourgeois, 1126 N. Front St., both of Marquette, Mich. 49855

Filed Aug. 21, 1975, Ser. No. 606,658
Int. Cl.² B63H 25/06
U.S. Cl. 115—18 B 1 Claim



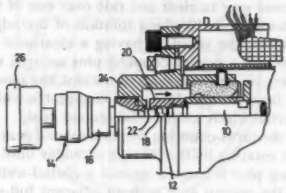
1. A rudder attachment for an outboard motor, which outboard motor has a gear case carrying a propeller and a horizontal cavitation plate above the propeller, said rudder attachment comprising a rudder, and means for mounting said rudder in upright position behind the propeller, said mounting means consisting of two identical elongated horizontal metal strips, two identical right angle brackets and fasteners, said elongated horizontal metal strips being fixedly removably secured by certain of said fasteners in surface-to-surface relation to said cavitation plate, said strips having rearwardly projecting portions extending beyond said cavitation plate, and said angle brackets having horizontal flanges fixedly removably secured in surface-to-surface relation by certain of said fasteners to said rearwardly projecting portions of said metal strips and upright flanges fixedly removably secured by certain of said fasteners in surface-to-surface relation to opposite sides of the upper portion of said rudder.

3,991,701

BEARING WEAR DETECTING DEVICE FOR CANNED MOTOR DRIVEN PUMPS

Ryuich Sato, Tokyo, Japan, assignor to Nikkiso Co., Ltd., Tokyo, Japan

Filed Aug. 21, 1975, Ser. No. 606,603
Int. Cl.² G01D 3/08
U.S. Cl. 116—114 Q 8 Claims



1. A bearing wear detecting device for canned motor driven pumps, comprising a rotary shaft of a canned motor driven pump having a hole extending in an axial direction from one end of said rotary shaft; an enlarged chamber formed in said rotary shaft at a position distant apart from said one end of said rotary shaft by a given distance and having a diameter larger than that of said hole and forming shoulders at boundarys between said hole and said enlarged chamber; and a hermetically sealed pipe provided at its one end with an enlarged sensitive portion and at another end with an indicator, said enlarged sensitive portion being enclosed in said enlarged chamber of said rotary shaft, whereby when the bearing wear causes said rotary shaft to move in a thrust direction, said shoulders are urged against a part of said enlarged end sensitive portion of said hermetically sealed pipe to rupture it and when the bearing wear causes said rotary shaft to move in a radial direction, the inner peripheral wall of said enlarged chamber is urged against the outer peripheral portion of said enlarged end sensitive portion of said hermetically sealed pipe to rupture it, thereby indicating the degree of the bearing wear.

3,991,702

TURNS-COUNTING DIAL

Anthony E. Taylor, P.O. Box D, La Verne, Calif. 91750

Filed July 18, 1975, Ser. No. 596,982
Int. Cl.² G01P 13/00
U.S. Cl. 116—115 5 Claims

1. A turns-counting dial for use with a multi-turn device having a rotatable shaft and being adapted for mounting on a panel, comprising:

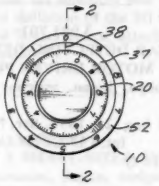
a stationary base adapted to be clamped to the panel and having a central opening therethrough to receive the shaft;

a knob adapted to be secured to the shaft to be rotatable therewith with respect to the base;

a turns-counting ring rotatably mounted on the base, and a first gear on the turns-counting ring concentric with the shaft;

a second interrupted-tooth gear rotatably mounted on the base, the second gear having a portion with an even number of teeth of alternately full and partial width extending generally parallel to the shaft axis, the first and second gears being meshed;

a coupling ring rotatably mounted on the base concentric with the shaft and connected to the knob to rotate therewith, the coupling ring defining an annular locking shoulder positioned to extend convexly into the periphery of



the second gear to clear and ride over one of the partial-width teeth while blocking rotation of the adjacent full-width teeth, the shoulder having a clearance slot therethrough and a pair of coupling pins secured to the coupling ring on opposite sides of the slot, the pins extending axially from the shoulder to be engageable with both full- and partial-width teeth of the second gear,

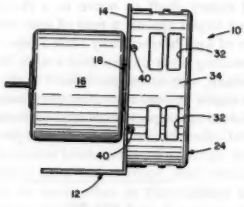
whereby the turns-counting ring and second gear are locked against rotation by the locking shoulder until one of the coupling pins is rotated against a partial-width tooth to rotate the second gear with an adjacent full-width tooth passing through the clearance slot.

3,991,703

SIREN FOR ALARM AND METHOD OF MAKING THE SAME

James H. Faust, Cicero, and Walter M. Busse, Chicago, both of Ill., assignors to A.B.C. Auto Alarms, Inc., Chicago, Ill.

Filed Sept. 8, 1975, Ser. No. 611,501
Int. Cl.² G10K 7/02
U.S. Cl. 116—147 **4 Claims**



1. In a radial flow siren which includes a motor, means for mounting the motor with a shaft protruding, a perforated cup-shaped stator coaxial with the shaft and having the perforations around the circumference thereof, the invention herein which comprises a perforated and vaned rotor mounted on the shaft for rotation relative to the stator and arranged to draw air into the siren axially and discharge it through the perforations radially, and said rotor

A. being formed of an integral sheet metal stamping,

B. having a circular base plate provided at the center thereof with means for mounting the rotor to the shaft,

C. having a plurality of shear-formed upstanding vanes of indentical polygonal configuration and having a right angle corner, said vanes being connected to said base plate equally spaced circumferentially about the center of the base plate and perpendicular thereto,

D. each vane being formed by material removed and bent up from the base plate and thereby leaving an opening in the base plate to only one edge of which the vane is connected by a bend, the opening being of substantially the same configuration as the vane,

E. a cylindrical flange around the base plate and the vanes being arranged to have an edge of each which is adjacent said corner approaching closely to the inside surface of the flange and being at a substantial angle thereto, and

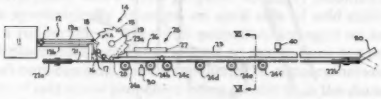
F. the cylindrical flange having generally rectangular perforations each adjacent a respective vane.

3,991,704

COATING APPARATUS

Calvin Hulstein, South Windsor, and William Gelinas, Enfield, both of Conn., assignors to Loctite Corporation, Conn.

Filed July 18, 1974, Ser. No. 489,767
Int. Cl.² B05C 1/02, 11/02
U.S. Cl. 118—2 **18 Claims**



1. An arrangement for applying a band of coating material around the shank of headed articles along a selected portion thereof, comprising: feeding means for supplying a plurality of such articles; conveyor means for conveying such articles along a predetermined path; transfer means for receiving such articles from said feed means, accelerating said articles to a predetermined speed and supplying them into positive engagement with said conveyor means while maintaining a predetermined minimum distance between each article; coating means arranged adjacent to said conveyor means along the path travelled by such articles for coating the shanks of such articles with the coating material; said conveyor means including a pair of generally parallel conveyor elements arranged within a plane extending in a substantially horizontal direction for conveying such headed articles so that their shanks extend in a vertical direction, means supporting said elements in a spaced relation, said conveyor elements being arranged with respect to said transfer means such that both of said conveyor elements positively grip each article while it is still in engagement with said transfer means, and means for moving one of said elements relative to the other in a direction from said transfer means towards said coating means; and means for maintaining said conveyor elements in a closely spaced relation to each other in the locations of both said transfer means and said coating means so as to frictionally grip the shanks of the articles for positively feeding said articles in succession along the predetermined path and past said coating means while maintaining the relative positions of the articles on the predetermined path.

3,991,705

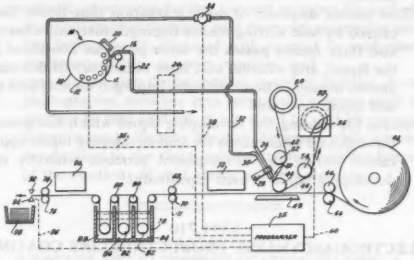
APPARATUS FOR PREPARING SMEARS OF BIOLOGICAL LIQUIDS

Stanford L. Adler, Monsey, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,505
Int. Cl.² B05C 1/14
U.S. Cl. 118—7 **8 Claims**

1. Apparatus for preparing a smear of a biological liquid, comprising: a movable first element having a surface extending in a first direction, a movable second element having a second surface, said surfaces being adapted to have portions thereof in opposing relation, means for locating said surface

portions of said elements in at least close proximity, means for introducing at one time a predetermined discrete volume of the biological liquid between said surface portions which are in at least close proximity, positive means to move each of said elements, control means for actuating and positive means for



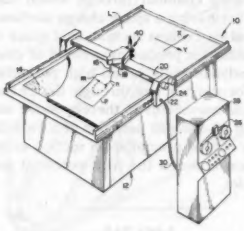
said second element relatively to said first element to present said surface portion of said second element in said opposing relation to the surface portion of said first element, and said control means actuating said positive means for moving said first element a limited distance, so as to wipe a smear of said biological liquid on a limited area of one of said elements.

3,991,706

MARKING APPARATUS UTILIZING A DYE THREAD

David R. Pearl, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., East Hartford, Conn.

Filed Jan. 20, 1976, Ser. No. 650,791
Int. Cl.² B05C *11/00*
U.S. Cl. 118—7 **9 Claims**



1. In combination with an automatically controlled cutting machine having a cutting tool mounted on a tool platform over a support surface on which sheet material is placed in a spread condition to permit the tool and material to move relative to one another and cut pattern pieces from the material, the improvement comprising:

a needle plunger mounted on the tool platform for reciprocation along an axis of the plunger toward and away from sheet material on the support surface;

a needle depending from the plunger along said axis for penetration through the sheet material when the plunger is reciprocated toward the support surface and having an eyelet in the depending needle end;

a supply spool rotatably mounted on the tool platform for feeding a marking thread to the eyelet of the needle;

a takeup spool also rotatably mounted on the tool platform for receiving marking thread from the eyelet of the needle;

actuating means connected with the needle plunger for reciprocating the plunger along the plunger axis and reciprocating the needle in and out of the sheet material; and

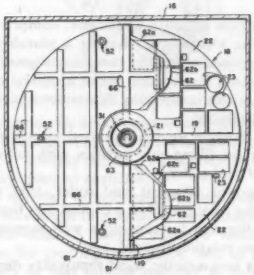
indexing means connected with the takeup spool and operatively responsive to said actuating means reciprocating the plunger and needle for advancing a length of marking thread from the supply spool through the eyelet of the needle to the takeup spool.

3,991,707

VAPOR DEPOSITION APPARATUS WITH MASK MEANS

Alfred J. Thelen; John A. Aguilera, both of Santa Rosa; James N. Grant, Healdsburg, and George Eugene Michel, Santa Rosa, all of Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Continuation of Ser. No. 751,695, Aug. 6, 1968, abandoned, which is a continuation of Ser. No. 522,738, Jan. 24, 1966, abandoned. This application Mar. 24, 1971, Ser. No. 127,783
Int. Cl.² C23C *13/08*
U.S. Cl. 118—9 **2 Claims**

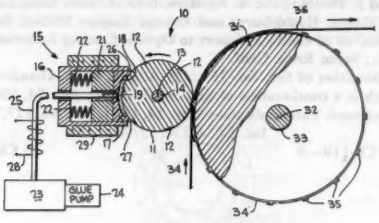


1. In a coating apparatus for producing coatings having a substantially uniform thickness, a vacuum chamber, a rack having a radius of greater than approximately twenty inches rotatably mounted in the chamber for rotation about a vertical axis, said rack being adapted to carry a plurality of substrates to be coated in positions spaced transversely from the axis of rotation and mounted at different angular positions on the rack ranging through the entire 360° of the rack, means for rotating the rack and the substrates carried thereby, a stationary source disposed in the chamber and containing a coating material which evaporates to produce a vapor stream directed towards all of said substrates carried by the rack, and a stationary mask disposed in said chamber between said source and said rack, said mask subtending approximately 180° and interrupting a substantial portion of the vapor stream including that portion of the vapor stream having the greatest angle of incidence with respect to the substrates carried by the rack whereby all of said substrates on said rack are sequentially coated with a coating of substantially uniform thickness, by a vapor stream that is generally normal to exposed substrates said mask being formed to permit a plurality of substrates carried by the rack and disposed at different angles to be exposed simultaneously to the vapor stream from the source, said mask including frontally protruding masking portions which are arcuate in a somewhat sinusoidal manner and which are uniformly spaced from said vapor source and the axis of rack rotation, said mask and vapor source being each transversely spaced from the axis of rack rotation and upon opposed sides of a diameter passing through said axis of rack rotation, and monitor chip means operatively associated with said mask, rack and said source so as to be directly and continuously exposed to said vapor stream.

3,991,708
GRAVURE-TYPE ADHESIVE APPLICATOR

John W. Huebschmann, Youngstown; H. Dean Packard, Lewiston, and William D. Swiercz, Lakeview, all of N.Y., assignors to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed June 23, 1975, Ser. No. 589,131
Int. Cl.² B05C *1/08*
U.S. Cl. 118—44 3 Claims



1. A gravure-type adhesive applicator, comprising:

a roller of the intaglio-type having a plurality of spaced cavities provided along the periphery thereof, said roller being mounted for rotation about a central axis thereof, and said cavities comprising depressions having substantially flat bottoms;

an adhesive feeding device mounted circumferentially of said roller for filling said cavities with adhesive during rotation of said roller;

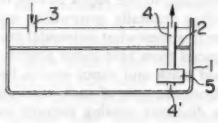
a wheel disposed adjacent said roller, said wheel being mounted for rotation about a central axis thereof parallel to said roller axis for moving a web supported by said wheel upon rotation thereof; and

a continuous non-metallic band removably disposed about the periphery of said wheel, said band having a plurality of resilient pads spaced therealong and extending radially outwardly thereof beneath the web, said pads being spaced apart a distance equal to the spacing of said cavities, each of said pads having an outer dimension slightly larger than the outer dimension of each of said cavities, and the thickness of each of said pads being slightly greater than the depth of each of said depressions, whereby, during rotation of said roller and said wheel, spaced portions of the web are intermittently forced into said cavities for extracting spots of adhesive therefrom to thereby spot wet said web with adhesive spots comparably sized to that of said depressions.

3,991,709
REGENERATING DEVICE FOR DEVELOPING LIQUID

Tadashi Sato, Kokubunji, and Ikuo Soma, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 449,079, March 7, 1974, abandoned, which is a continuation of Ser. No. 222,110, Jan. 31, 1972, abandoned. This application Apr. 28, 1975, Ser. No. 572,333
Claims priority, application Japan, Feb. 9, 1971, 46-5495; June 10, 1971, 46-41343
Int. Cl.² B05C *11/00*
U.S. Cl. 118—612 7 Claims



1. An electrophotographic apparatus wherein a developing liquid containing toner particles is applied to an electrophotographic photosensitive member, in a development process, said apparatus comprising:

a container for recovering the developing liquid which has been used in the development process;

means for stirring the developing liquid within said container;

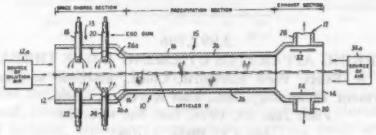
filter means disposed at such a position that liquid flow caused by said stirring means impinges thereon, wherein said filter means passes the toner particles contained in the liquid, and wherein said filter means subdivides condensed masses of toner particles impinged thereagainst by said liquid flow; and

means for feeding the developing liquid which has passed through said filter means for said developing liquid application during the development process, whereby the developing liquid is used repeatedly.

3,991,710
ELECTROGASDYNAMIC PRODUCTION LINE COATING SYSTEM

Meredith C. Gourdine, Fort Lee; Stephen Diamond, Livingston, and Donald Porter, Carlstadt, all of N.J., assignors to Energy Innovations, Inc., East Orange, N.J.

Filed June 1, 1973, Ser. No. 366,121
Int. Cl.² B05B *5/02*
U.S. Cl. 118—634 23 Claims

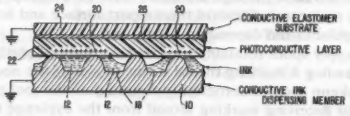


1. A production line coating system including means for moving articles to be coated along a predetermined path of movement, a coating chamber through which said path extends, said chamber having a space charge section, a precipitation section, and an exhaust section, said space charge section including means for producing a cloud of charged particles at electrogasdynamically raised high potentials, and gas moving means for moving gas through the chamber in the direction of article movement to thereby move said substantially intact cloud of charged particles at a correlative speed with said articles in said precipitation section to increase the time for attraction between the high potential particles and the moving articles.

3,991,711
ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET-DEVELOPING

Keita Nakano, Yokohama, and Takuzo Tsukamoto, Chigasaki, both of Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1973, Ser. No. 405,504
Claims priority, application Japan, Oct. 11, 1972, 47-101120
Int. Cl.² G03G *15/10*
U.S. Cl. 118—637 6 Claims



1. Apparatus for wet-developing an electrostatic latent image comprising

an electroconductive ink-supply member having an uneven surface comprising a plurality of raised portions and

depressions below said raised portions, at least the surface of said ink-supply member being electroconductive;

means for supplying ink to said ink-supply member so that the ink is held in said depressions;

an electrophotographic member bearing said electrostatic latent image;

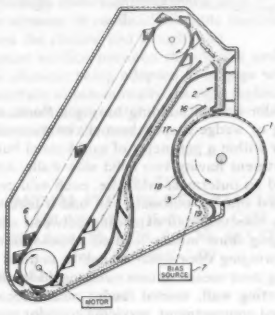
an elastic, electroconductive support member for said electrophotographic member, said electrophotographic member being fixedly disposed with respect to said elastic, electroconductive support member; and

means for bringing the ink-supply member and the electrophotographic member into substantial contact with one another so that said ink is attracted to said electrostatic latent image to thereby develop the image while minimizing damage to the electrophotographic member because of the elasticity of said elastic support member.

3,991,712
CASCADE DEVELOPMENT STATION HAVING A ROUGHENED DEVELOPMENT PLATE FOR ENHANCING DEVELOPER MIXTURE TURBULENCE

James E. Genthe, Chelmsford, and William R. Buchan, Lincoln, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Continuation-in-part of Ser. No. 429,616, Jan. 2, 1974, abandoned. This application Feb. 6, 1975, Ser. No. 547,851
Int. Cl.² G03G *15/08*
U.S. Cl. 118—637 **23 Claims**

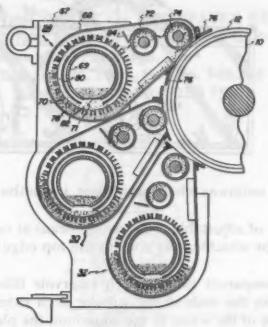


1. In a xerographic development station including: an imaging member having a surface for bearing an electrostatic image to be developed; a development plate having a surface spaced from said imaging member surface for defining a development zone therebetween; and means for introducing developer into said development zone to be cascaded therethrough along paths of travel adjacent said imaging member surface for developing said electrostatic image, the improvement comprising: wherein said development plate surface comprises a roughened surface for defining a large plurality of angled deflection elements thereon, said deflection elements covering at least a substantial portion of said development plate surface and being shaped to introduce a substantial component of motion to said developer in a direction transverse to said paths of travel thereof through said development zone for directing said cascading developer toward said imaging member surface for increasing development efficiency.

3,991,713
DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE

Charles A. Whited, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 444,089, Feb. 20, 1974, Pat. No. 3,926,516. This application June 30, 1975, Ser. No. 591,582
Int. Cl.² G03G *15/09*
U.S. Cl. 118—637 **5 Claims**



1. An apparatus for developing an electrostatic latent image with electrostatically charged particles, including:

a developer housing defining a chamber for storing electrostatically charged particles;

a tubular member of non-magnetic material journaled for rotary movement in said developer housing;

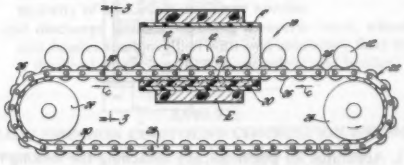
a magnetic member fixedly disposed within said tubular member for creating a magnetic field in the path of the periphery of said tubular member to form a brush-like array of charged particles on said tubular member; and

at least one conductive plate closely spaced to the electrostatic latent image to suppress the effects of local contrast enhancement said conductive plate being mounted movably on said developer housing so that the space between said conductive plate and the latent image may be substantially optimized.

3,991,714
METHOD OF MAGNETICALLY TREATING EGGS AND ANIMAL SEMEN

Raymond D. Amburn, 8325 Riverland Drive (Bldg. 6 No. 1), Sterling Heights, Mich. 48078

Division of Ser. No. 403,571, Oct. 4, 1973, Pat. No. 3,910,233. This application July 21, 1975, Ser. No. 597,844
Int. Cl.² A01K *45/00*
U.S. Cl. 119—1 **11 Claims**

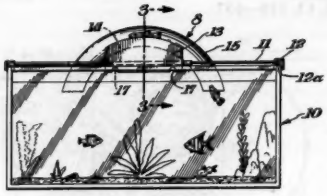


10. A method of treating fertile eggs to increase the hatch rate of the eggs and the growth rate of the fowl hatched from the treated eggs comprising: placing the eggs in a magnetic field of predetermined intensity of about 60 gauss or more to expose the eggs to the magnetic field; and then removing the eggs from the magnetic field after a predetermined period of time in the range of about 3 to 10 seconds.

3,991,715
ATTACHMENT FOR AQUARIUM TANKS

Joseph W. Gibson, Jr., 1215 Hillside Blvd., Carrcroft, Wilmington, Del. 19803

Filed July 1, 1975, Ser. No. 592,221
Int. Cl.[2] A01K 63/00
U.S. Cl. 119—5 7 Claims



6. A fish swimway which comprises, in combination with an aquarium:

a. A pair of adjustable rods having means at each end of the rods for attaching the rods to the top edge of the aquarium;

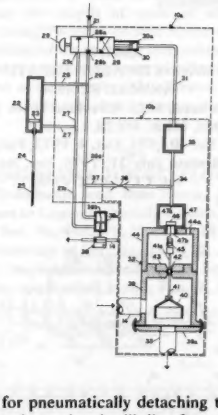
b. A transparent tubular arch reservoir filled with water wherein the ends of the tubular arch extend below the surface of the water in the aquarium, the plane of each of the openings in each end of the tubular arch are at least at a right angle with the surface of the water and wherein the diameter of the tubular arch is sufficiently large for fish to pass through; and

c. Mounting means for supporting the tubular arch on the adjustable rods.

3,991,716
PNEUMATIC TEAT CUP DETACHING APPARATUS

Rolf W. Reisgies, Norco, Calif., assignor to Germania Dairy Automation Incorporated, Corona, Calif.

Filed June 9, 1975, Ser. No. 585,193
Int. Cl.[2] A01J 7/00
U.S. Cl. 119—14.08 8 Claims



1. Apparatus for pneumatically detaching the milking machine teat cups and associated milk line from the udder of an animal after the animal has substantially stopped providing milk, comprising:

a. drive means operably connected to said teat cups for drawing said teat cups away from said udder when said drive means is supplied with air under pressure;

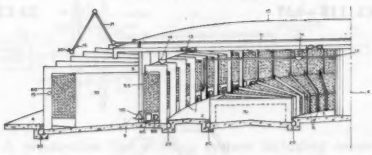
b. milk flow valve means connected in the milk line leading from said teat cups for shutting off said milk line and the milking vacuum to said teat cups when said milk flow valve means is supplied with air under pressure; and

c. pneumatic control means adapted to receive air under pressure, said pneumatic control means including a control valve and also including milk flow sensor means connected in said milk line for sensing milk flow in said milk line, said sensor means having an opening for venting air supplied to said sensor means and having valve means for cutting off the flow of air from said opening upon substantial cessation of milk flow to said sensor means to allow a build-up of air pressure to activate said control valve, said control valve upon such actuation providing air under pressure to activate said drive means and said milk flow valve means a selected period of time after said milk flow sensor means has sensed that the milk flow has substantially stopped.

3,991,717
KENNEL, CIRCULAR FACILITY

Robert Royce Buchanan, 340 Rosewood Ave., San Jose, Calif. 95117

Filed Dec. 4, 1975, Ser. No. 632,841
Int. Cl.[2] A01K 1/00
U.S. Cl. 119—19 8 Claims



1. A circular kennel building having a floor, at least one annular ring of wedge-shaped kennel compartments located on said floor within a perimeter of said kennel building, each said compartment having two solid side walls, an innermost end gate and an outermost end gate, each said compartment being bisected into an outboard run and a feeding watering section by a bisecting wall extending between said two sidewalls, swinging door means located in said bisecting wall, automatic swinging door latch means to control opening of said swinging door means, access swinging door means located in said bisecting wall, animal feeder means located in said wedge-shaped compartment, servicing corridor means located annularly in said kennel building, each said compartment having one end wall in contact with said corridor, annular gutter means located in said floor adjacent said innermost end wall and said outermost end gate of each said compartment, a circular roof extending from center of said building toward said perimeter and covering said feeding-watering section of each said compartment and covering or partially covering said outboard run section of each said compartment, means for providing uncontaminated fresh air to each said compartment, decontamination means for sterilizing egress air leaving each said compartment, exhaust fan means located in said roof, automatic compartment cleaner means comprising radially movable hose means extending from center of said roof toward said perimeter of said building, controllable valve means on said hose means to permit control of ejectioon of wash fluid from said hose means, drive means for selectively moving said hose means successively from compartment to compartment in turn, means for motivating an animal to move from one section of each said compartment to the other section of each said compartment and control means located in said building for programming and controlling all above said means.

3,991,718

SILOS

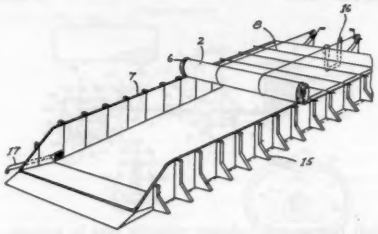
Wolf Walter Stinnes, 31 Johan Rissik Ave., Pretoria, South Africa (0002)

Filed May 6, 1975, Ser. No. 575,083

Claims priority, application South Africa, May 8, 1974, 74/2927

Int. Cl.² A01K 5/00

U.S. Cl. 119—51 R 10 Claims



1. A silo suitable for producing silo fodder, comprising:
an open-topped trough structure of generally U-shaped cross-section and having an inclined bottom surface;
a low level discharge means leading from the bottom of the trough structure for draining excess liquid;
a high level siphon outlet leading from the top of the trough structure for the discharge of gases;
a trough closure of semi-rigid flexible material, which is progressively removable and adapted to be removed to at least partially open the trough structure;
a tongue element of resiliently flexible material associated between the closure and trough; and
an abutment surface between the closure and trough, the tongue element being adapted to engage with the abutment surface in substantially gas-tight fashion for providing a substantially gas-tight seal between the closure and the side walls of the trough.

3,991,719

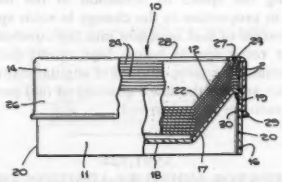
ANIMAL FEEDING RECEPTACLE

David Bruce, 1330 Alta Vista, Hollywood, Calif. 95234

Filed Sept. 15, 1975, Ser. No. 613,579

Int. Cl.² A01K 5/00

U.S. Cl. 119—61 6 Claims



1. An animal feeding receptacle means, comprising in combination:
a holder including an interior bowl-shaped chamber wall, a cylindrical wall surrounding said chamber wall, said chamber wall and cylindrical wall having a common top rim;
a plurality of separable nested impervious bowl-shaped liners received within and stored in said bowl-shaped chamber,
said liners having circumferential edge portions overlying said top rim,
the uppermost liner being exposed for use;
and a retainer member for holding the nested liners in said chamber in assembly with said holder and comprising
a cylindrical sleeve receivable over said nested liners and slidably fitted on the upper portion of said holder,
said sleeve having a flange means at its top edge overlying and retaining said liner edge portions against said top rim of said holder.

3,991,720

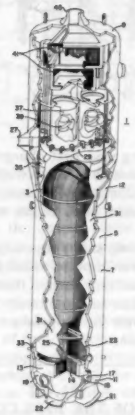
J TUBE DISCHARGE OR FEEDWATER HEADER

Wilbur M. Byerley, Riverview, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1975, Ser. No. 545,235

Int. Cl.² F22B 1/06; F22D 1/28

U.S. Cl. 122—32 10 Claims



1. A vapor generator utilizing a primary fluid to vaporize a secondary fluid, said vapor generator comprising
a shell portion,
a plurality of tubes forming a tube bundle and disposed within said shell portion,
a tube sheet having a plurality of openings disposed therein for receiving end of said tubes,
a wrapper encircling said tube bundles and forming an annular space adjacent to said shell,
an inlet header for said secondary fluid,
an inlet nozzle for said secondary fluid in fluid communication with said inlet header,
a plurality of discharge nozzles in fluid communication with the upper portion of said inlet header,
at least one of said discharge nozzles being disposed adjacent said inlet nozzle and being at a lower level than the majority of said other discharge nozzles,
said discharge nozzles including a reverse bend, whereby said header remains filled with said secondary fluid even if the level within the shell drops below said header.

3,991,721

LOW EMISSION COMPOUND COMBUSTION ENGINE

Fraser A. Hurd, 103 Fifth St., Liverpool, N.Y. 13088

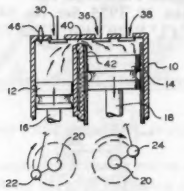
Filed Jan. 17, 1974, Ser. No. 434,017

Int. Cl.² F02B 75/12

U.S. Cl. 123—1 R 18 Claims

1. An eight-event, compound cycled engine comprising, in combination:
a. first and second enclosed power chambers each having therein a movable element to create an alternately increasing and decreasing enclosed volume;

b. inlet means associated with each of said chambers;
c. exhaust means to the atmosphere only through said second chamber;
d. restractable wall means between said first and second chambers movable between retracted and closed positions and through which the enclosed volumes of said first and second power chambers directly communicate when in said retracted position, thereby forming a common chamber;
e. means for introducing a fuel-rich, oxygen-lean first charge through said inlet means to said first power chamber;



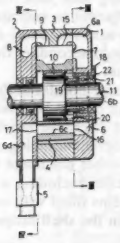
f. means for igniting said first charge to provide a power impulse to the movable element within said first chamber;
g. means for introducing a fuel-lean, oxygen-rich second charge through said inlet means to said second power chamber; and
h. means for opening said retractable wall means subsequent to said power impulse within said first chamber and introducing said second charge, thereby creating combustible mixing within said common chamber and of said second charge with the by-products of said first charges partial combustion.

3,991,722

ROTARY ENGINE OF THE TYPE COOLED BY AN AIR-FUEL MIXTURE INTAKE

Tetsuzo Fujikawa, Kobe, and Shinichi Tamba, Kakogawa, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Aug. 18, 1975, Ser. No. 605,245
Claims priority, application Japan, Aug. 21, 1974, 49-96484
Int. Cl.² F02B *53/04*
U.S. Cl. 123—8.13 **6 Claims**



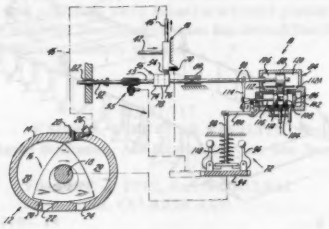
1. A rotary engine, of the type cooled by an air-fuel mixture intake, comprising, in combination, a first side housing having at least one side port formed therein; a second side housing; a rotor housing disposed between said first and second side housings and having a main peripheral port formed therein and communicating with said at least one side port; a by-pass peripheral port formed in said rotor housing and communicating with the by-pass passage formed in said second side housing; and a carburetor; said side port communicating with said carburetor through a main passage including a passage portion formed in said rotor, and said by-pass peripheral port communicating with said carburetor through a by-pass passage independent of said passage portion formed in said rotor.

3,991,723

FUEL INJECTION SYSTEM FOR ROTARY INTERNAL COMBUSTION ENGINE

David M. Myers, Upper Saddle River, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Apr. 28, 1975, Ser. No. 572,127
Int. Cl.² F02B *53/10;* **F02M** *39/00*
U.S. Cl. 123—8.09 **6 Claims**



1. A spark-ignited rotary internal combustion engine of the Wankel type comprising a housing having a cavity and a rotor supported for planetary rotation within the cavity and defining with the housing a plurality of combustion chambers each of which successively expand and contract in volumetric size as the rotor and housing rotate relative to each other, the housing being provided with an inlet port and an exhaust port for respectively passing air into the combustion chambers and gaseous products of combustion from the combustion chambers, in combination with an improved fuel injection system comprising:
a. at least one fuel injection nozzle in the housing located to discharge fuel into successive combustion chambers;
b. a positive displacement fuel pump having an inlet port means for receiving fuel from a source thereof and an outlet port for discharging fuel therefrom;
c. said pump having a fuel displacement means which coacts with the inlet and outlet ports to force fuel entering said inlet port out of the outlet port;
d. conduit means connected to said outlet port of said pump and to said injection nozzle to conduct fuel discharged from the outlet port to said injection nozzle and discharge therefrom into the combustion chambers; and
e. actuating means for effecting actuation of the fuel displacement means and including changing means for changing the speed of actuation of the displacement means in proportion to the change in rotor speed so that the duration of fuel injection into the combustion chambers at rotor speeds below high speed occurs during substantially the same amount of angular displacement of the rotor and for the same quantity of fuel per revolution of the rotor as at high speed.

3,991,724

APPARATUS FOR MOISTURE ADDITION TO ENGINE AIR-FUEL INPUT

Edward M. Geiser, Downers Grove, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

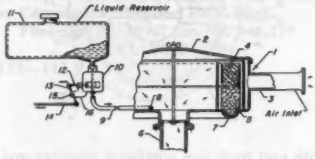
Filed Mar. 1, 1974, Ser. No. 447,440
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 R **6 Claims**

1. In an internal combustion engine, means for providing moisture to the fuel-air mixture passing to the fuel intake means for said engine, said first named means comprising in combination,

a. an air intake means to said engine, an upper air filter element and an air pervious wettable member positioned therebelow and adjacent thereto, said element and member being disposed adjacent to said air intake means, said member being positioned in only a portion of the flow path of air from said air intake means,

b. a holding means for said wettable member,

c. a fillable liquid retaining means in interconnection with said holding means and positioned adjacent the lower



portion of said wettable member for contact therewith and to effect wetting thereof only from the lower surface thereof whereby, under freezing conditions, ice formation in the upper portion of said wettable member is precluded, and

d. means for at least periodically filling said liquid retaining means to maintain fluid in contact with said wettable member, whereby the air stream to the fuel supply means will be humidified by passage through and over the surface of said wettable member.

3,991,725

INTERNAL COMBUSTION ENGINE HAVING AUXILIARY COMBUSTION CHAMBERS

Yasuhiko Nakagawa, Fujisawa; Katsunori Terasaka, Yokohama; Susumu Kimura, and Masanobu Yoshioka, both of Yososuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

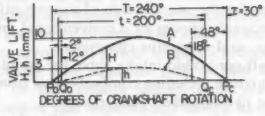
Filed May 6, 1974, Ser. No. 467,486

Claims priority, application Japan, May 8, 1973, 48-50942; May 8, 1973, 48-50943; May 8, 1973, 48-50944

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² F01L *1/34*

U.S. Cl. 123—32 SP **12 Claims**



1. A reciprocating-piston, four-stroke spark-ignition internal combustion engine having main and auxiliary combustion chamber comprising main and auxiliary intake valves respectively associated with said main and auxiliary combustion chambers in each of engine cylinders, the auxiliary intake valve having a valve lift smaller than a valve lift of the main intake valve, the auxiliary intake valve being operated to open for a duration shorter than a duration of opening of the main intake valve, the auxiliay intake valve being operated to start to open after the main intake valve has been opened, and to fully close simultaneously as or before the main intake valve is fully closed and to fully close at a timing later than the bottom dead center of the engine on the compression stroke.

3,991,726

ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM

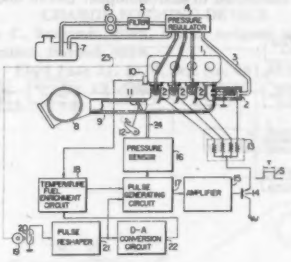
Mitsuo Kawai, Toyota, and Shigehiko Ito, Aichi, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Jan. 17, 1975, Ser. No. 542,001

Claims priority, application Japan, Jan. 26, 1974, 49-11219

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **3 Claims**



1. An electronically controlled fuel injection system comprising a temperature sensor for detecting the temperature of an internal combustion engine, a temperature fuel enrichment circuit responsive to the output signal of said temperature sensor for generating an output signal corresponding to a temperature fuel enrichment characteristic for providing the required fuel enrichment in the low temperature range of said engine, and fuel injection means responsive to the output signal of said temperature fuel enrichment circuit for injecting an increased amount of fuel, wherein the improvement comprises a revolution compensation circuit connected to said temperature fuel enrichment circuit for generating an output signal corresponding to the number of revolutions of said engine thereby to continuously decrease the temperature fuel enrichment characteristic in accordance with increase in the number of revolutions of said engine, whereby said increased amount of fuel injected depends on both the engine temperature and the revolutions of the engine, with the increased amount of fuel decreased as the engine temperature and the revolutions of the engine respectively increase.

3,991,727

ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM

Hisasi Kawai, Toyohashi, and Ritsu Katsuoka, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 30, 1975, Ser. No. 573,153

Claims priority, application Japan, June 14, 1974, 49-68577

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **8 Claims**

1. An electronically controlled fuel injection system comprising:

a constant presetting circuit for generating a constant signal having a frequency corresponding to a preset numerical value;

an intake-air amount detecting circuit for generating a binary coded intake-air amount signal corresponding to the amount of air drawn into an internal combustion engine;

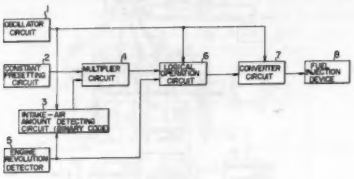
an engine revolution detecting circuit for generating an engine revolution pulse signal having a time width inversely proportional to rotational speed of said engine;

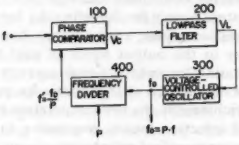
an oscillator circuit for generating clock signals of a preset frequency;

a multiplier circuit connected to said constant presetting circuit and said intake-air amount detecting circuit, said multiplier circuit including a voltage controlled oscillator

for generating a multiple signal whose frequency is controlled by an input voltage, a frequency divider for dividing said multiple signal in accordance with said intake-air amount signal, and a phase comparator for comparing an output signal of said frequency divider with said constant signal, an output voltage of said phase comparator being applied as said input voltage to said voltage controlled oscillator to make said multiple signal have a frequency corresponding to the product of said constant and said amount of air drawn into said engine;

a logical operation circuit connected to said multiplier circuit connected to said multiplier circuit and said engine revolution detecting circuit for performing a logical operation on said multiple signals and said engine revolution signal and generating a binary coded fuel injection quantity signal which determines the quantity of fuel to be injected into said engine for each unit of rotation of said engine;





a converter circuit connected to said logical operation circuit and said oscillator circuit for generating an injection activation pulse signal having a time width proportional to said fuel injection quantity signal; and

fuel injection means connected to said converter circuit for injecting fuel into said engine in response to said injection activation pulse signal.

3,991,728

ROTARY ENGINE

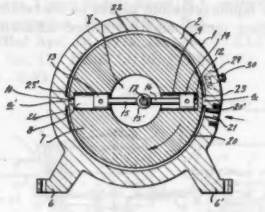
Murray B. Vittert, 10317 Sannois, St. Louis County, Mo. 63141

Filed May 10, 1974, Ser. No. 468,752

Int. Cl.[2] F02B *57/00*

U.S. Cl. 123—44 D **13 Claims**

1. A rotary internal combustion engine comprising a casing having a cylindrical compartment, an annular rotor provided within said compartment in close fitting relationship with the inner face thereof but being relatively rotational therein, a drive shaft extending transversely through said casing and passing through said rotor, and being in normal relationship to the plane of rotation of said rotor, said drive shaft being eccentric with respect to the transverse axis of said casing, said rotor having first and second cylindrical chambers having axes radially of said rotor and each having inner and outer end portions, a fuel compression piston provided in said first cylindrical chamber, a power piston provided in said second cylindrical chamber, means connecting each piston through the inner end portion of the respective cylindrical chamber with said drive shaft, said casing having a fresh fuel admission chamber opening into said compartment, said casing having fuel inlet means connecting said fresh fuel admission chamber with the casing exterior, said casing having a fuel compression chamber opening into the interior of said compartment and being spaced from said fresh fuel admission chamber, said first cylindrical chamber having a passage for sequential communi-



cation with said fresh fuel admission chamber and said fuel compression chamber, means introducing compressed fuel from said fuel compression chamber into the outer end portion of said second cylindrical chamber, and means igniting the compressed fuel within said second cylindrical chamber.

3,991,729

METHOD AND APPARATUS FOR INTRODUCING A COMBUSTIBLE MIXTURE INTO THE CYLINDERS OF AN INTERNAL COMBUSTION ENGINE

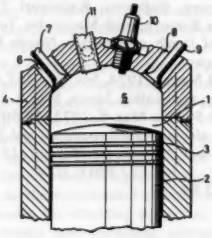
Pietro Notaro, Berlin, Germany, assignor to H.G.N. Motoren GmbH & Co., Hamburg, Germany

Filed June 6, 1974, Ser. No. 476,916

Claims priority, application Germany, June 14, 1973, 2330249

Int. Cl.[2] F02M *23/04*; **F02B** *75/02*; **F02D** *13/00*; **F02B** *41/00*

U.S. Cl. 123—75 B **8 Claims**



1. Apparatus for the introduction of a combustible mixture into a conventional cylinder of a conventional internal combustion engine, said apparatus comprising

a. a camshaft-controlled intake valve for admitting a combustion mixture including combustion air from a carburetor or the like into the cylinder, and

b. means responsive to the pressure within the cylinder for admitting an amount of combustion air at substantially atmospheric pressure into the cylinder in addition to the combustion air in said combustible mixture admitted by said intake valve so that the additional combustion air is introduced during the suction stroke of the piston and the introduction of additional combustion air will generally cease only when the suction stroke is finished so that the cylinder is substantially filled with combustible mixture, said means including at least one inlet valve comprising a spherical valve member, an inlet aperture for allowing entrance of air into the cylinder when not blocked by said valve member, a valve seat for cooperation with said valve member to block said inlet aperture when the pressure in the cylinder is greater than the pressure in said

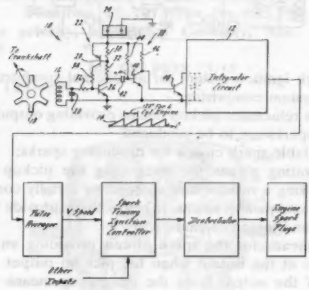
inlet aperture, and means for limiting the movement of said spherical valve member while not interfering with air flow from said inlet aperture to the cylinder when the pressure in the cylinder is less than the pressure in said inlet aperture.

3,991,730

NOISE IMMUNE RESET CIRCUIT FOR RESETTING THE INTEGRATOR OF AN ELECTRONIC ENGINE SPARK TIMING CONTROLLER

Frederick William Crall, Farmington, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jan. 30, 1975, Ser. No. 545,275
Int. Cl.² F02P 1/00
U.S. Cl. 123—117 R 3 Claims



1. In combination:

an internal combustion engine having an electronic spark timing controller of the type having an integrator circuit which provides a crank position signal and which is periodically reset at predetermined engine crank angles;

pick-up means operatively coupled with the engine for developing a train of bi-polar pulses wherein each bi-polar pulse is generated at a predetermined crank angle and each bi-polar pulse comprises a leading pulse portion of one polarity and a trailing pulse portion of opposite polarity;

a D.C. power supply having a pair of terminals;

a bi-stable circuit means energized from said power supply and operatively coupled with said pick-up means to receive said train of bi-polar pulses, said bi-stable circuit means comprising a first bi-polar transistor of one conductivity type having its base-emitter circuit operatively connected with said pick-up means to receive said bi-polar pulses and having its emitter-collector circuit operatively connected in series with a pair of series-connected resistors across said power supply, a second transistor of conductivity type opposite that of said first transistor having its base-emitter circuit operatively connected across one of said resistors and having its emitter-collector circuit connected through a third resistor from a terminal of said power supply to the base of said first transistor whereby said first transistor has the voltage signal appearing at one of its emitter and collector terminals switched from a first signal level to a second signal level in response to a given magnitude of said trailing pulse portion of each bi-polar pulse and from said second signal level to said first signal level in response to a given magnitude of said leading pulse portion of each bi-polar pulse;

an RC monostable circuit means including a timing capacitor and a transistor with said capacitor being directly electrically connected between the terminal of said first transistor at which said voltage signal appears and the base terminal of said monostable transistor whereby said monostable transistor generates an output pulse of predetermined width in response to switching of said voltage signal from said first signal level to said second signal level; and

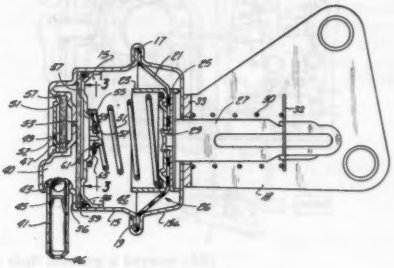
electronic switch means operatively coupled with said monostable transistor and said integrator circuit for resetting said integrator circuit in response to said output pulse of said monostable transistor.

3,991,731

CHARGE FORMING DEVICE

Benjamin C. Benjamin, Flint, Mich., assignor to Schmelzer Corporation, Durand, Mich.

Filed June 21, 1974, Ser. No. 481,481
Int. Cl.² F02M 1/10, 1/08
U.S. Cl. 123—119 F 16 Claims



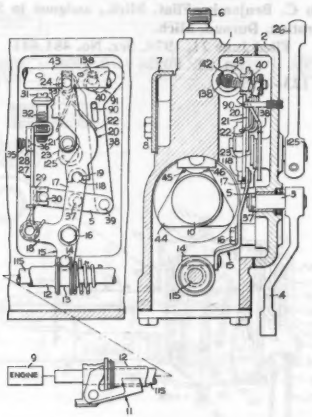
1. A charge forming device for an internal combustion engine including an induction passage forming inlet and outlet portions, a choke valve in the passage adjacent the inlet portion, a temperature responsive element operatively connected to the choke valve and adapted to urge the valve to a closed position with a force inversely proportioned to temperature, a vacuum responsive device operatively connected to the choke valve and adapted to move the same from a closed position to a partially open position at a controlled rate in response to a predetermined vacuum at said outlet portion, said vacuum responsive device including a casing, a flexible diaphragm dividing the casing into two main chambers, resilient means urging the diaphragm and operatively connected choke valve to a closed position, a rigid wall assembly separating one of the main chambers into first and second subchambers, said rigid wall assembly including a main filter element for filtering air flow between the subchambers, at least one aperture in said rigid wall assembly, a flexible valve member movable in response to pressure differential between a closed position normally engaging said rigid wall assembly and an open position spaced from said wall to permit air flow from the first subchamber adjacent to the flexible diaphragm directly through said aperture to the second subchamber, bypass means formed in said rigid wall assembly and communicating said aperture with said first subchamber when said valve member is in its closed position for permitting restricted fluid flow in either direction between said subchambers, and a vacuum passage adapted to connect said second subchamber with a source subject to manifold vacuum pressure at said outlet portion.

3,991,732

FUEL INJECTION TIMING CONTROL

Alexander Dreisin, Olympia Fields, Ill., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 28, 1975, Ser. No. 636,169
Int. Cl.[2] F02M 59/28, 59/20
U.S. Cl. 123—140 R 10 Claims



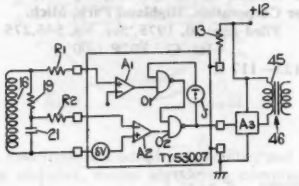
1. A multiple plunger fuel injection pump for an internal combustion engine comprising, a pump housing means defining a plurality of bores, a plunger received in each of said bores and defining a fuel injection pumping chamber, means defining a fuel supply chamber, each of said plungers defining passage means selectively communicating between the supply chamber and the injection pumping chamber for supplying fuel to said injection pumping chamber, a control sleeve mounted for reciprocal and rotational movement about each of said plungers and defining port means with said plunger for controlling the closing and opening of said passage means in said plunger between the supply chamber and the fuel injection pumping chamber, means sequentially reciprocating each of said plungers in said bores for pumping fuel in said fuel injection pumping chamber, a speed responsive device adapted for connection to an engine including a control member moving in response to engine speed, a drive lever defining a drive arm, a timing arm and a quantity control arm, means connecting said drive arm to said control member of said speed responsive device, a control rod connected to each of said control sleeves providing rotational and reciprocating movement of said control sleeves, a quantity control linkage connected between said quantity control arm and said control rod reciprocating said control rod and rotating said control sleeves, a throttle control pivotally connected to said quantity control linkage to modify movement of said control rod in response to movement of said throttle control, a timing linkage connected between said timing arm and said control rod rotating said control rod and reciprocating said control sleeves, a variable fulcrum timing modulation lever in said timing linkage for modifying fuel injection timing, a timing link defining a cam slot means, follower means on said control rod received in said cam slot means modifying the rotational movement of said control rod as said rod is reciprocated, said linkage is thereby controlling the quantity, timing and modulation of fuel delivery of said fuel injection pump.

3,991,733

SPARK IGNITION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Paul Anthony Harris, Walsall, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Sept. 26, 1974, Ser. No. 509,402
Claims priority, application United Kingdom, Sept. 28, 1973, 45468/73
Int. Cl.[2] F02P 1/00
U.S. Cl. 123—148 E 2 Claims



1. A spark ignition system for an internal combustion engine, said system comprising:

a variable reluctance pickup means providing output pulses when sparks are to be produced;

a controllable spark circuit for producing sparks;

an integrating means for integrating the pickup output comprising a resistor and a capacitor serially connected across said pickup means, to respectively provide proportional and integral signals; and

control means for the spark circuit providing an output thereto at the instant when the pick-up output is zero, only if the output from the integrating means has exceeded a predetermined value;

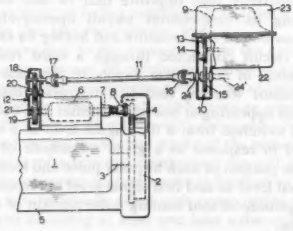
said control means comprising a first voltage comparator connected across said capacitor for comparing the integral of the output of the pick-up with a fixed voltage level, a second voltage comparator connected across said resistor for detecting when the output of the pick-up is zero, and a gate circuit for producing an output pulse when the integral of the pick-up output exceeds the fixed voltage level and the output of the pick-up is zero; whereby the risk of spurious pick-up signals producing a spark is minimized.

3,991,734

STARTING SYSTEM FOR INTERNAL COMBUSTION ENGINES OF THE COMPRESSION IGNITION TYPE

John Crawford Martin, 139 Laird Drive, Toronto, Ontario, Canada (M5H 2J7)

Filed Dec. 19, 1974, Ser. No. 534,424
Int. Cl.[2] F02N 17/00
U.S. Cl. 123—179 E 4 Claims



1. In a starting system for an internal combustion engine of the compression ignition type, the system including a cranking motor having a main shaft, said main shaft providing a first shaft extension extending from one end of the cranking motor

and carrying a pinion engageable with a starter gear of the engine for starting the engine, an auxiliary engine of the spark ignition type having a crankshaft, and transmission means including a clutch and gear train interconnecting the crankshaft of the auxiliary engine with the main shaft of the cranking motor, the gear train including an output gear rotatable with said main shaft; the improvement in which the main shaft of the cranking motor provides a second shaft extension extending from the opposite end of the motor coaxially with the first shaft extension and carrying said output gear, said clutch being operable to couple the crankshaft of the auxiliary engine to said gear train for driving said pinion from the auxiliary engine through the main shaft of the cranking motor.

3,991,735

INTERNAL COMBUSTION ENGINE

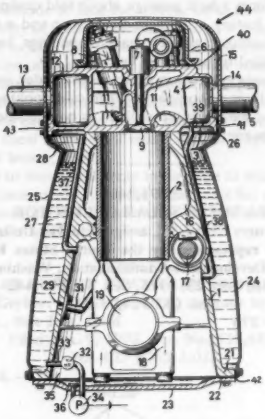
Bernhard Horstmann, Glehn-Espendorf, Germany, assignor to International Harvester Company, Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,335

Claims priority, application Germany, Nov. 26, 1974, 2455865

Int. Cl.² F02B *75/18*

U.S. Cl. 123—195 C **27 Claims**



6. In an internal combustion engine having lubricating and liquid cooling systems including lubricant and coolant medias for use therein, a cylinder block having sidewalls, a cylinder head carried on top of the block, first soundproofing cowling means for encasing the sidewalls at a spaced-apart distance therefrom and second soundproofing cowling means for encasing the cylinder head at a spaced-apart distance therefrom, the space between the outer surface of the sidewalls and the inner surface of the first cowling means forming a reservoir for the lubricant media and the space between the outer surface of the cyinder head and the inner surface of the second cowling means forming a chamber for the coolant media; the lubricant and coolant medias in their respective spaces providing sound bearers to engine noise.

3,991,736

RATCHET DRIVING INTERNAL COMBUSTION ENGINE

Robert C. Spellman, Alhambra, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,486

Int. Cl.² F02B *75/32*

U.S. Cl. 123—197 R **1 Claim**

1. A ratchet driving internal combustion engine, comprising:

an engine block forming a first cylinder and a second cylinder,

a first piston mounted in the first cylinder,

a shaft connected to the first piston,

a second piston connected to the shaft and mounted in the second cylinder,

a spark plug mounted in the first cylinder,

a spark plug mounted in the second cylinder,

valves mounted in the first cylinder,

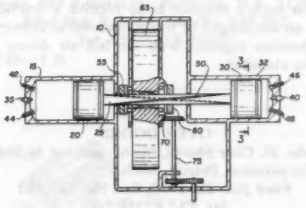
valves mounted in the second cylinder, whereby the pistons may be moved by internal combustion,

a wall of the first cylinder forming a linear keyway,

a bearing mounted in the first piston and engaging the linear keyway, whereby the first piston may reciprocate in the first cylinder but is prevented from rotating,

a wall of the second cylinder forming a second linear keyway,

another bearing mounted in the second piston and engaging the second linear keyway, whereby the second piston may reciprocate in the second cylinder but is prevented from rotating,



the shaft forming a keyway (**50**)

a first stud engaging the keyway (**50**),

a first ratchet nut mounted on the shaft and engaging the first stud near the first cylinder,

a second stud engaging the keyway (**50**),

a second ratchet nut mounted on the shaft and engaging the second stud near the second cylinder,

a flywheel rotatably mounted on the shaft,

a first lug attached to the flywheel on a side of the flywheel near the first ratchet nut,

the first ratchet nut forming a recess which releasably engages the first lug, whereby the first piston may drive the first ratchet nut to drive the flywheel to rotate,

a second lug attached to the flywheel on a side of the flywheel near the second ratchet nut,

the second ratchet nut forming a recess which releasably engages the second lug, whereby the second piston may drive the second ratchet nut to drive the flywheel to rotate,

the flywheel forming a gear, and

another gear engagably connected to the gear of the flywheel, whereby the rotation of the flywheel may drive a device.

3,991,737

FORCED-CONVECTION OVEN

Claudio Del Fabbro, Porcia, Pordenone, Italy, assignor to Zanussi Grandi Impianti S.p.A., Pordenone, Italy

Filed Apr. 30, 1975, Ser. No. 573,256

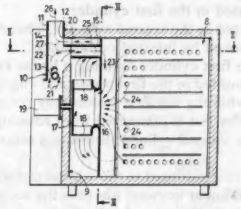
Claims priority, application Italy, May 18, 1974, 45729/74

Int. Cl.² F24C *15/32*

U.S. Cl. 126—21 A **7 Claims**

1. A direct heating forced convection oven comprising a heating chamber, a ventilation chamber laterally adjacent and communicating with the heating chamber, a combustion chamber laterally adjacent the ventilation chamber, at least one burner housed in the combustion chamber to provide hot air, at least one outlet duct communicating with the ventila-

tion chamber, at least one blower housed in the ventilation chamber with an intake mouth communicating with the heating chamber and at least one discharge mouth arranged in such a manner as to direct ventilated air partly to the heating chamber and partly to the outlet duct and an intake duct passing through the ventilation chamber to draw hot air from



the combustion chamber to the heating chamber, said intake duct communicating with the ventilation chamber and being arranged in such a manner as to receive a fraction of the ventilated air discharged by the blower and to convey it to the heating chamber together with the hot air drawn from the combustion chamber.

3,991,738

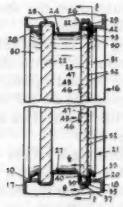
OVEN DOORS

Jacob Krebs, St. Clair Shores, Mich., assignor to Shatterproof Glass Corporation, Detroit, Mich.

Filed Jan. 22, 1975, Ser. No. 543,062

Int. Cl.² F23M *7/00*

U.S. Cl. 126—200 **17 Claims**



1. An oven door comprising a main body portion having a substantially rectangular opening therein, a window unit mounted in said opening comprising a substantially rectangular frame having a window opening therein, said frame being formed with spaced inner and outer substantially continuous channels defining the window opening therein, inner and outer glass panels mounted in said inner and outer channels respectively in spaced, parallel relation and closing said window opening, said inner glass panel being fixedly secured in said frame, and means for releasably securing said outer glass panel in said frame.

3,991,739

PORTABLE KITCHEN

John R. Hoffman, Jr., P.O. Box 2112, Myrtle Beach, S.C. 29577

Filed July 15, 1975, Ser. No. 596,095

Int. Cl.² F24C *5/20*

U.S. Cl. 126—268 **4 Claims**

1. A cooking apparatus comprising in combination:

a frame having a rear, a front and a central portion;

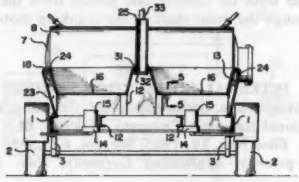
a pressure fuel container secured to said central portion of said frame;

support means on said frame in each said rear and front portions;

a first and second cooking pan mounted on said front and rear support means respectively;

each said cooking pan having several adjacent compartments joined at adjacent edges by a flat plate;

each said compartment having a bottom, and side walls rising from said bottom, the side walls forming the outer edges of said cooking pan having the top edge of said



walls rolled outwardly and downwardly and extended down to form a heat passage about said compartment;

said bottom having a stainless steel inner and a steel outer layer including regularly spaced openings having their edges welded to said inner layer;

a burner means located on said support under and in registration with each compartment in said cooking pan;

control valve means and fuel lines to couple said fuel tank and said burners.

3,991,740

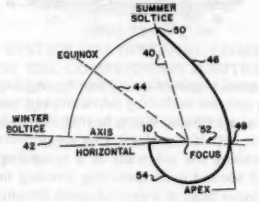
SEA SHELL SOLAR COLLECTOR

Ari Rabl, Downers Grove, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 28, 1975, Ser. No. 599,442

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **5 Claims**



1. A stationary nonimaging cylindrical solar radiation concentration device, having a seasonably variable concentration factor comprising:

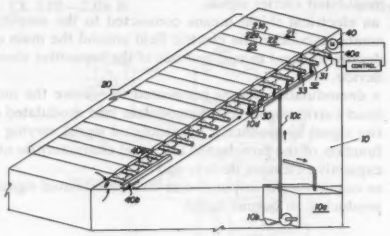
a reflective side wall for directing radiant energy with a transverse cross section in the form of a parabola whose axis is a first line parallel to an extreme ray of the sun at one of the solstices, said parabola extending from the apex of said parabola along said first line to a second line parallel to an extreme ray of the sun at the other solstice, and an energy absorber positioned to receive solar energy crossing an exit aperture whose transverse cross section is defined by a third line from the focus of said parabola to said apex of said parabola, said energy absorber and said side wall extending parallel to a reference axis perpendicular to the transverse cross section of said side wall to form a trough-shaped structure.

3,991,741

ROOF-LENS SOLAR COLLECTOR

Leonard L. Northrup, Jr., 4312 Westway, Dallas, Tex. 75205, and Mark J. O'Neill, 11243 Lanewood Circle, Dallas, Tex. 75218

Filed Mar. 20, 1975, Ser. No. 560,303
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 16 Claims



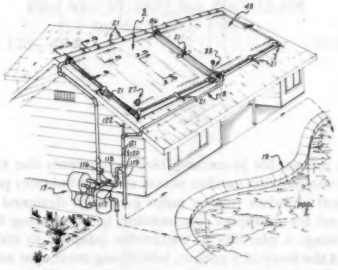
1. A solar energy collector which comprises:
a. a fixed panel of light transmitting material mounted at a given latitude to face the remote earth pole and including a plurality of linear lenses the axes of which extend parallel one to the other in an east-west direction to focus the sun's rays onto a plurality of focal lines behind said lens,
b. an absorbing array comprising a like plurality of linear solar energy absorbing elements, at least one linear element for each of said lenses, mounted beneath said panel at the focal distance of said lenses and oriented parallel to said lenses, and
c. means to move said array in daytime to maintain each of said elements always at the focal point for a given lens in compensation for variations in the sun's elevation angle relative to said panel.

3,991,742

SOLAR ENERGY HEAT TRANSFER SYSTEM

Dennis H. Gerber, Los Gatos, Calif., assignor to Burke Industries, Inc., San Jose, Calif.

Filed Jan. 9, 1975, Ser. No. 539,651
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 10 Claims



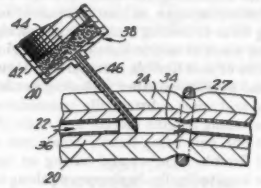
1. A gravity solar energy absorbing and heat transfer system for warming a pool of water comprising:
a. a thin, large area solar panel including a water impermeable flexible lower member, and a very thin, flexible upper member which have substantially no connection therebetween and which has a low reflective outer surface and a wettable inner surface and has high solar energy absorbing qualities and the separation of said upper and lower members may vary depending upon the flow rate of the water supply;
b. a thin, flexible fluid spreader sheet having an irregular surface disposed between and in touching contact with a substantial portion of said panel upper and lower members for creating turbulence in said water flow for wetting substantially all of said upper and lower panel members and said spreader maintains a substantially uniform minimum separation between said upper and lower panel members;
c. a distributor member disposed along the upper inner edge of said panel for evenly distributing fluid across substantially the entire upper edge of said panel;
d. a collector member for collecting the fluid at the lower edge of said panel;
e. supply means for continuously supplying fluid to said distributor member at a relatively constant rate; and
f. gravity discharge means connected to said collector member for returning said fluid to said body of fluid.

3,991,743

CONCEPTION-PREVENTING AND VARIABLE FILTERING OR FLOW CONTROL DEVICES AND METHODS

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Filed Oct. 9, 1974, Ser. No. 513,292
Int. Cl.² A61B 19/00
U.S. Cl. 128—1 R 38 Claims



1. In a method for at least temporarily preventing the ejaculate of a male from containing viable sperm in numbers sufficient for conception, the steps of implanting in a vas deferens a filter means for at least temporarily providing for the flow of vas fluid through the vas deferens a selective flow path across which the filter means extends and along which the filter means at least in part by filteration provides for the sperm a path of flow along which said filter means acts, said filter means including means preventing in a mechanical, nonchemical manner viable sperm from being carried along with the fluid in numbers sufficient for conception, and securing the thus-implanted filter means to the vas deferens for remaining at a predetermined location of the vas deferens.

3,991,744

PROCESS FOR TREATING PSYCHOPHYSIOLOGICAL CONDITION

Barry A. Goodfield, 3 Circle Drive, Ross, Calif. 94957

Filed Apr. 22, 1975, Ser. No. 570,403
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 H 3 Claims

1. The process for treating a psychophysiologic condition comprising
A. scanning a human subject with a thermographic means having a visual display of temperature variations over the body of said subject,
B. determining areas having temperature aberrations,
C. inducing an hypnotic state in said subject,
D. focusing the attention of said subject while in said state on the area displaying a temperature aberration and regressing said subject to a traumatizing experience affecting said area,

E. maintaining said subject's attention focused on said traumatizing experience until said temperature aberration becomes unstable, and

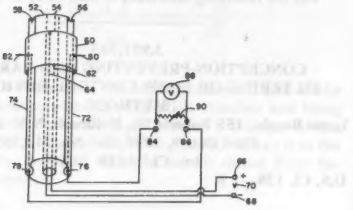
F. bringing said subject out of said hypnotic state.

3,991,745

CURVATURE MEASUREMENT DEVICE

Wilfred Yoslow, Brooklyn; Alvin Bicker, East Setauket, and Mark L. Yoslow, New York, all of N.Y., assignors to Wilmark Electronic Co., Inc., New York, N.Y.

Division of Ser. No. 392,489, Aug. 29, 1973, Pat. No. 3,908,279. This application Aug. 20, 1975, Ser. No. 606,170
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S **3 Claims**



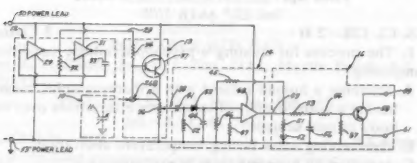
1. A device for measuring curvature of a spine comprising an elongated flexible member, at least one pair of substantially parallel sensing wires extending longitudinally along said flexible member, the wires of said at least one pair being disposed on opposing sides of said flexible member and together defining a plane, said flexible member including retaining means for maintaining said wires substantially coextensive with said flexible member along lengths thereof and each of said wires of said at least one pair being fixedly connected at one end thereof to said flexible member and having an opposite end thereof free for longitudinally displacement along said flexible member within said plane, where flexing of said flexible member within said plane causes the free ends of said at least one pair of sensing wires to be displaced relative to each other in opposing directions along said flexible member; deviation means coupled to said free ends for producing an electrical signal proportional to a change of relative longitudinal positions of said free ends of a respective pair of sensing wires to thereby provide a measure of curvature within the respective plane; and attaching means connected to said flexible member for mounting said flexible member on the back of a wearer, said attaching means permitting flexure of said flexible member.

3,991,746

PATIENT MONITORING SYSTEM AND METHOD

Harry Allen Hanna, Des Moines, Iowa, assignor to Medical R & D, Limited, Des Moines, Iowa

Filed Mar. 31, 1975, Ser. No. 563,487
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S **21 Claims**



1. A patient monitoring system comprising:

a. an electrically insulated capacitive element device having one side positionable adjacent a patient to be monitored, said capacitive element device including a main conductive element,

b. a carrier means connectable in an electrical circuit with the capacitive element device for producing a carrier frequency signal to set up an electric field around the main conductive element, said carrier frequency signal modulated by patient movement,

c. an amplifying means connected to be responsive to the capacitive element device and connected to receive the modulated carrier signal,

d. an electrical shield means connected to the amplifying means to confine the electric field around the main conductive element to said one side of the capacitive element device,

e. a demodulating means connected to receive the modulated carrier signal and demodulate said modulated carrier signal to produce a demodulated signal varying as a function of the preselected electrical characteristic of the capacitive element device; and

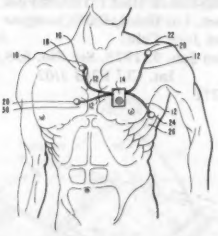
f. an output means responsive to the demodulated signal for producing an output signal.

3,991,747

PORTABLE CARDIAC MONITORING SYSTEM AND METHOD

Albert L. Stanly, Los Angeles, and Gunther W. Wimmer, Saugus, both of Calif., assignors to Albert L. Stanly, Los Angeles, Calif.

Continuation of Ser. No. 265,473, June 23, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 495,091
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 R **29 Claims**



1. A system for processing electric currents due to potentials accompanying cardiac action of an ambulatory patient or electrical impulses from a pulse generator designed to pace the heart for multiplex transmission to monitoring facilities, comprising: a plurality of electrodes adapted to electrically contact the body of a patient, amplifying means for amplifying signals fed thereto, means coupled to the amplifying means for providing an indication of information carried by amplified signals from the amplifying means, a plruality of buffer amplifier means coupled between the amplifying means and the electrodes, and sequencing means coupled to and controlling the buffer amplifier means, the sequencing means including means for rendering selected ones of the buffer amplifier means conductive to pass signals to the amplifying means and for simultaneously coupling a selected one of the buffer amplifier means as a ground connection in response to potentials from selected ones of said electrodes at selected intervals.

3,991,748

CIRCUIT ARRANGEMENT FOR THE PROCESSING OF PHYSIOLOGICAL MEASURING SIGNALS

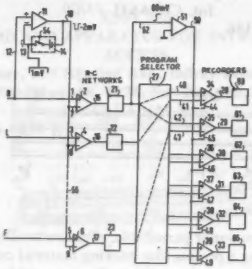
Thomas Ohlsson, Vallingby, Sweden, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed June 19, 1975, Ser. No. 588,464

Claims priority, application Germany, June 21, 1974, 2429955

Int. Cl.[2] A61B 5/04

U.S. Cl. 128—2.06 B 6 Claims



1. In a circuit arrangement for the processing of physiological measuring signals, a plurality of input amplifiers; branch signal electrodes being connected to said input amplifiers; and a program selector for connecting differential amplifiers to the outputs of at least two of said input amplifiers pursuant to a selected program, the improvement comprising: calibrating impulse generator means being connected to the inputs of all of said input amplifiers for raising the input voltages of said input amplifiers; means connecting said differential amplifiers to said calibrating impulse generator means, each said differential amplifier having a further calibrating input for receiving a calibrating signal from said calibrating impulse generator means, said signal at the calibrating input being superimposed on the differential signal in each said differential amplifier; and means for connecting the outputs of said differential amplifiers to recording means.

3,991,749

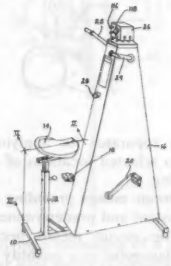
EXERCISING APPARATUS

Lawson J. Zent, 1818 Dean St., Huntington, Ind. 46750

Filed Nov. 17, 1975, Ser. No. 632,455

Int. Cl.[2] A61H 1/02

U.S. Cl. 128—25 R 16 Claims



1. In an exercising apparatus; a frame, including a base and a column, support means for supporting a seat on the column, an upright portion on the frame forwardly of said column having foot pedals independently rotatable thereon near the bottom and hand graspable crank arms independently rotatable thereon near the top, first drive means connecting each foot petal with the crank arm on the same side of the apparatus, a drive motor in the frame, second drive means connecting the drive motor to said foot pedals for rotation of the foot pedals at respective speeds of rotation, an energizing circuit for said motor, first means in said circuit for varying the speed of said motor, and second means in said circuit for reversing said motor.

3,991,750

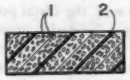
DROMOSTANOLONE PROPIONATE IMPLANT PELLET USEFUL FOR PRODUCING WEIGHT GAINS IN ANIMALS AND SUPPRESSING ESTRUS IN FEMALE ANIMALS

Brian H. Vickery, Cupertino, Calif., assignor to Syntex Corporation, Palo Alto, Calif.

Filed Apr. 28, 1975, Ser. No. 572,691

Int. Cl.[2] A61M 7/00; A61J 1/00

U.S. Cl. 128—260 38 Claims



1. A solid, subcutaneously implantable pellet for producing a greater than normal weight gain in animals and suppressing estrus in female animals, which pellet comprises about 1% to about 99.5% by weight of the 17-propionate of 2α-methyl-androstan-17β-ol-3-one in combination with about 0.5% to about 99% by weight of a biocompatible carrier, said carrier being present in an amount sufficient to maintain the structural integrity of the pellet when implanted in the animal's body.

3,991,751

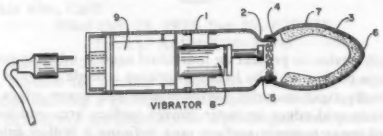
PORTABLE VIBRATOR

Jessie O'Rourke, Indianola, Okla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1975, Ser. No. 605,616

Int. Cl.[2] A61H 19/00

U.S. Cl. 128—36 3 Claims



1. A portable vibrator, comprising

a substantially tubular housing dimensioned to be held in a hand and having an open neck end, said housing having a predetermined diameter throughout its length and a diameter smaller than the predetermined diameter at the neck end thereof and being rounded down at its neck end from the predetermined diameter to the smaller diameter;

a head removably affixed to the housing at the neck end thereof and having substantially the predetermined diameter at an intermediate part thereof and substantially the smaller diameter at the end affixed to the housing and being rounded down at its affixed end from the predetermined diameter to the smaller diameter thereby forming a substantially annular trough-like indentation in the area of the neck end of the housing; and

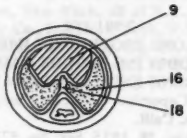
electric vibrating means in the housing for vibrating the head.

3,991,752

PENILE IMPLANT

Frank J. Gerow, Houston, Tex., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 4, 1975, Ser. No. 637,557
Int. Cl.² A61F 5/00
U.S. Cl. 128—79 6 Claims



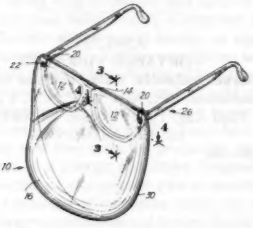
1. A prosthesis for the penis comprising a generally oval shank portion having a distal portion at one end and a proximal portion at the other end, the distal portion and the proximal portion each having a face with arced surface, the prosthesis tapering from the distal portion to the proximal portion and having ventral surface, the ventral surface having a longitudinal channel formed therein extending through the face of the proximal portion notching it.

3,991,753

DEVICE FOR PREVENTING AN INDIVIDUAL FROM INHALING GERMS, FOREIGN BODIES, OR THE LIKE

Gabriel Viesca y Viesca, Insurgentes Sur 1180-401, Mexico City, Mexico

Filed Jan. 15, 1975, Ser. No. 541,211
Int. Cl.² A62B 7/00
U.S. Cl. 128—146.2 6 Claims



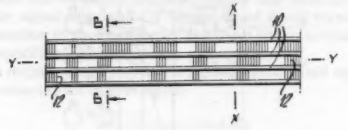
1. A device to protect an individual against inhaling germs, foreign bodies, and the like, comprising a single sheet of substantially rigid material having upper and lower edges and between said edges an outer convex surface area and an opposed inner concave surface area defining a hollow interior portion of the sheet which is adapted to receive the nose, mouth, and chin of the individual, and mounting means connected to said sheet for mounting the latter on the head of an individual in a position where the nose, mouth, and chin of the individual are received in the hollow interior of said sheet without engaging said inner surface area of said sheet, said sheet including a substantially flat portion extending from an upper peripheral edge of said outer convex and inner concave surface areas thereof towards said upper edge and thereby, adapted to be situated adjacent a pair of spectacles and to be situated in front of the eyes of the individual, and said flat portion having a pair of planar clear transparent regions adapted to be situated in front of the eyes of the individual, respectively, and said regions having optical properties according to which light can pass through said regions with substantially no light loss and without distortion of light rays so that the vision of the individual is substantially unaffected by said regions of said flat portion of said sheet, said substantially flat portion having an upper edge region, and said mounting means including a pair of clips fixed to said sheet at said upper edge region thereof outwardly beyond said transparent regions of said flat portion for clipping said sheet to a pair of spectacles.

3,991,754

SURGICAL ADHESIVE TAPE

Arthur A. Gertzman, Bridgewater, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Sept. 15, 1975, Ser. No. 613,157
Int. Cl.² A61L 15/00
U.S. Cl. 128—156 23 Claims



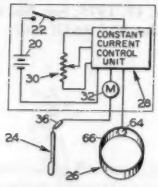
1. A moisture vapor permeable, pressure sensitive adhesive tape comprising a porous film backing material coated on one surface with a pressure sensitive adhesive, said backing material comprising a patterned and fibrillated thermoplastic, fiber forming polymeric film having a plurality of substantially parallel continuous monofilaments interconnected by a plurality of fibrils extending between adjacent monofilaments, said fibrils and said monofilaments defining rows of openings between adjacent monofilaments, the total open area of said film being from about 10 to 70 percent.

3,991,755

IONTOPHORESIS APPARATUS FOR APPLYING LOCAL ANESTHETICS

Jack A. Vernon; Murlan R. Kaufman, both of Portland; Robert E. Brummett, Milwaukie, and Herman G. Bender, Portland, all of Oreg., assignors to Medicon, Inc., Portland, Oreg.

Continuation of Ser. No. 383,188, July 27, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 537,894
Int. Cl.² A61N 1/30
U.S. Cl. 128—172.1 7 Claims



1. Iontophoresis apparatus for applying ionizable liquid local anesthetics to selected locations of animal bodies, the apparatus comprising:

a. an electric circuit means providing a source of direct current of constant and predetermined magnitude;

b. in the electric circuit means first electrode means adapted for placement in a quantity of ionizable liquid anesthetic contained in a selected body location to be anesthetized, said first electrode means comprising a length of electrically-conducting wire having inner and outer ends and an electrically-insulating sheath containing the wire, the sheath having inner and outer ends and being provided with a longitudinal slot at its outer end, the inner end of said wire being coupled to one pole of

said current source and the outer end of said wire being exposed at said slot in said sheath, and said sheath further including a pair of laterally-extending tabs, one on each side of said slot and dimensioned for spacing the exposed outer end of said wire a predetermined distance from the body in the selected body location; and

c. in the electric circuit means second electrode means connected to the other pole of the current source and adapted for placement in contact with the body in a location spaced from the first electrode means.

3,991,756

METHOD AND APPARATUS FOR INTRAVENOUS ACCESS

Donald Synder, 715 NE. 3rd Ave., Delray Beach, Fla. 33444

Filed Aug. 18, 1975, Ser. No. 605,335

Int. Cl.² A61M *5/00*

U.S. Cl. 128—214 R **23 Claims**

1. A single needle access portal to provide intravenous communication comprising,

a cannula: means for attaching said cannula attached to a selected artery or vein with one portion of said cannula exiting from the skin,

needle means having a tip and adapted for insertion in said cannula, and

means to selectively locate said needle tip along the interior of said cannula whereby driving said needle tip through said cannula and into the selected vein or artery achieves percutaneous access to the vascular system without repeated percutaneous needling of the skin.

3,991,757

HYPODERMIC SYRINGE

Oscar Jacques van Leer, Amstelveen, Netherlands, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstetveen, Netherlands

Filed June 16, 1975, Ser. No. 587,051

Claims priority, application Netherlands, June 17, 1974, 7408071

Int. Cl.² A61M *5/00*

U.S. Cl. 128—216 **7 Claims**

1. Hypodermic syringe consisting of a compressible reservoir of a material at least partly consisting of a thermoplastic synthetic material, which reservoir is coupled to a hypodermic needle and of which one wall is movable towards an opposite wall, said walls, movable with respect to each other, having a common hinge-point in the manner of a pointed bellows, which walls are coupled with each other and with a third collapsible wall via folding lines acting as hinges, the material of the reservoir being treated such at least on the spot of these folding lines, that it tries to move the mutually movable walls towards each other.

3,991,758

PHARMACEUTICAL SINGLE-DOSE CONTAINER

Klaus Möhrke; Heinrich Eggert; Helmut Franz, all of Biberach an der Riss, and Dieter Jarsen, Laupheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhine, Germany

Division of Ser. No. 345,745, March 28, 1973, Pat. No. 3,930,500. This application Nov. 4, 1975, Ser. No. 628,820

Claims priority, application Germany, Mar. 29, 1972, 2215215; Dec. 18, 1972, 2261913; Sept. 13, 1972, 7233642[U]; Dec. 18, 1972, 7246257[U]

Int. Cl.² A61M *7/00*; A61J *7/00*

U.S. Cl. 128—233 **16 Claims**

1. A pharmaceutical single-dose container comprising an elongate flexible plug-like closure member having one end in the container and extending through the wall of the container and having a portion thereof releasably sealed therein with the other end of said closure member extending outwardly of the container, said other end having a means for hand engagement to permit the elongate closure member to be pulled through and out of the container wall, thereby to provide a discharge opening through which the contents of the container can be discharged from the interior thereof.

3,991,759

METHOD AND THERAPEUTIC SYSTEM FOR TREATING AQUEOUS DEFICIENT DRY EYE

John Urquhart, Palo Alto, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Oct. 28, 1975, Ser. No. 625,918

Int. Cl.² A61M *7/00, 31/00*

U.S. Cl. 128—260 **21 Claims**

1. Method for treating an aqueous deficient dry eye comprising instilling a biologically compatible solute in the tear film of said eye continuously for a prolonged time period at a controlled rate that is sufficient to osmotically induce continuous emdogenous aqueous flow to the tear film during said period at a rate that increases aqueous tear production to a therapeutically effective level.

3,991,760

VAGINAL MEDICAMENT DISPENSING MEANS

James Lee Drobish, Wyoming, and Thomas William Gougeon, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

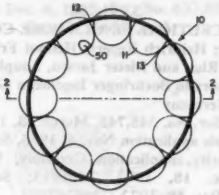
Filed Dec. 2, 1975, Ser. No. 636,898

Int. Cl.² A61M *31/00*; A61F *5/46*

U.S. Cl. 128—260 **12 Claims**

1. An article for use within the vaginal cavity characterized by: a plurality of containers, said containers having walls releasably containing a biologically active agent, said containers being connected by a thin, flexible seal fin in the plane perpendicular to the plane of the article defining a means for

holding said article in a substantially circular configuration comprising adjacent containers being carried by said fin in



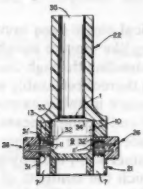
such manner as to provide points of abutment between adjacent containers.

3,991,761

INHALER FOR POWDERED MEDICAMENTS

Salvatore Cocozza, via San Gimigano 4/A, Milan, Italy

Filed Oct. 21, 1974, Ser. No. 516,829
Claims priority, application Italy, Mar. 18, 1974, 86249/74
Int. Cl.² A61M *13/00, 15/06*
U.S. Cl. 128—266 **18 Claims**



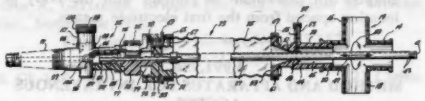
1. An inhaler for powdered medicaments comprising:
A. an elongated mouth-piece comprising a coaxially disposed inhalation passage;
B. a body portion comprising:
1. a chamber which is adapted to receive a capsule containing said medicaments and which is open communication with said inhalation passage, and
2. an air intake passage which is tangentially disposed to said chamber;
C. a pivot means, for pivotably connecting said mouth-piece and said body portion, comprising:
1. a hole within said body portion which is eccentrically disposed with respect to said chamber, and
2. a pivot pin which:
a. fits rotatably within said hole so that said pin and said hole are aligned when said pin and said hole are in register,
b. has a pivot-pin axis which is parallel to the axis of said mouth-piece, and
c. is attached to and eccentrically disposed on one side of said mouth-piece to allow disengagement or locking by a simple rotation about said pivot-pin axis of said body portion with respect to said mouth-piece;
D. a latching means for releasably securing said mouth-piece and said body portion when pivoted into register; and
E. a capsule-piercing means on said body portion for selectively perforating said capsule, whereby said medicaments are released when air is drawn into said air intake passage and swirled about within said chamber.

3,991,762

ASPIRATING DEVICE FOR PATIENT VENTILATION APPARATUS

F. Richard Radford, 3722 S. 182nd, No. B209, Seattle, Wash. 98188

Filed Sept. 30, 1974, Ser. No. 510,504
Int. Cl.² A61M *1/00*
U.S. Cl. 128—276 **7 Claims**



1. An aspirating device suitable for use in removing undesirable secretions from the trachea of a patient during ventilation, said aspirating device comprising:
A. a catheter cartridge including:
1. a catheter tube suitable for insertion into the trachea of a patient; and,
2. a protective housing surrounding at least the majority of the length of said catheter tube when said catheter tube is withdrawn, said protective housing adapted to allow one end of said catheter tube to be extended from said housing into the trachea of a patient and withdrawn therefrom;
B. a rotational mechanism including a wheel, said wheel including shafts extending axially outwardly from either side thereof, one of said shafts being affixed to the other end of said catheter tube, said wheel further including a longitudinal aperture extending axially through said shafts such that said longitudinal aperture in said one of said shafts is in communication with said other end of said catheter tube; and,
C. a vacuum coupling mechanism including a vacuum coupling housing, said wheel mounted inside of said vacuum coupling housing, said vacuum coupling housing including at least one aperture which allows access to said wheel such that said wheel can be manually rotated, the manual rotation of said wheel causes said catheter tube to be rotated, said vacuum coupling housing including an aperture having one end in communication with the other end of the longitudinal aperture formed in said wheel, the other end of said aperture in said vacuum coupling housing adapted for connection to a vacuum source.

3,991,763

SURGICAL EVACUATOR

Joseph Nicholas Genese, Waukegan, Ill., assignor to Arbrook, Inc., Arlington, Tex.

Filed Apr. 17, 1975, Ser. No. 569,042
Int. Cl.² A61M *1/00*
U.S. Cl. 128—278 **6 Claims**

1. A wound drainage device, comprising: a container for both withdrawing and collecting body fluids from a patient; means for increasing and decreasing the internal volume of said container; a fluid inlet port in the wall of said container;

first valve means for opening and closing said inlet port; a fluid outlet port in the wall of said container adjacent said fluid inlet port; one-way valve means associated with said outlet port for permitting the emptying of said fluids from said container when said internal volume is decreased but for preventing the entry of contaminants into said container; and gate means movable between a first position and a second position for actuating said first valve means, said gate means when in said first position being effective to open said first valve means and to cover said outlet port, and said gate means when in said second position being effective to close said first valve means and to uncover said outlet port.

3,991,764
PLASMA ARC SCALPEL

Frank P. Incropera, West Lafayette, and William J. Link, Indianapolis, both of Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Continuation of Ser. No. 419,620, Nov. 28, 1973, abandoned. This application Aug. 13, 1975, Ser. No. 604,234

Int. Cl.² A61B *17/36*

U.S. Cl. 128—303.1 **6 Claims**

1. A surgical tool for simultaneously incising and cauterizing live tissue comprising:

a tool body having exterior and interior portions and a discharge end;

means for supplying a cool inert gas to said tool body;

an anode and a cathode carried by said tool body, said anode having a tip portion adjacent to the discharge end of said tool body, and said anode and cathode being relatively movable with respect to one another;

a cathode carrier tube having a supply inlet near one end portion connected with said means for supplying said cool inert gas and an outlet near the other end portion, said other end portion having said cathode mounted thereon with said inert gas being conducted through said carrier tube and ejected adjacent said cathode and passed through a electrical arc, said gas being then discharged from said tool body through said discharge end thereof as plasma gas for contacting live tissue to be incised and cauterized adjacent to said discharge end of said tool body;

coolant passage means inside said tool body and extending to the tip portion of said anode to cool the anode including said tip portion;

electrical means to impress a desired voltage across the anode and cathode means; and

means to cause momentary movement of the cathode and anode toward contacting relationship to thereby establish an arc therebetween.

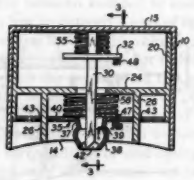
3,991,765
CRICOTHYROTOMY APPARATUS

Howard Cohen, 2791 W. 5th St., Brooklyn, N.Y. 11224

Filed Apr. 9, 1975, Ser. No. 566,447

Int. Cl.² A61B *17/24, 17/32;* **A61M** *16/00*

U.S. Cl. 128—305 **16 Claims**



1. Cricothyrotomy apparatus for establishing an emergency air breathing path for patients experiencing upper respiratory obstruction, said apparatus comprising: a housing; an air tube slideably mounted in said housing; a surgical blade in said housing; spring means biasing said air tube and said surgical blade to a position externally of said housing; detent means movably positioned to retain said surgical blade and said air tube against said spring biasing means; and means accessible from a point externally of said housing for releasing said detent means, to permit said biasing means to urge said surgical blade and said tube to a position externally of said housing.

3,991,766
CONTROLLED RELEASE OF MEDICAMENTS USING POLYMERS FROM GLYCOLIC ACID

Edward Emil Schmitt, Palo Alto, Calif., and Rocco Albert Polistina, Port Chester, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 365,656, May 31, 1973, Pat. No. 3,875,937, which is a continuation-in-part of Ser. No. 157,521, June 28, 1971, Pat. No. 3,739,773, which is a continuation-in-part of Ser. No. 852,617, Aug. 25, 1969, Pat. No. 3,620,218, which is a continuation-in-part of Ser. No. 608,086, Jan. 9, 1967, Pat. No. 3,463,158, which is a continuation-in-part of Ser. No. 320,543, Oct. 31, 1963, Pat. No. 3,297,033. This application Apr. 3, 1975, Ser. No. 564,969

Int. Cl.² A61L *17/00*

U.S. Cl. 128—335.5 **5 Claims**

1. A controlled release medicament device consisting of at least one filament of polyglycolic acid having incorporated therein a small but effective amount of an antibiotic.

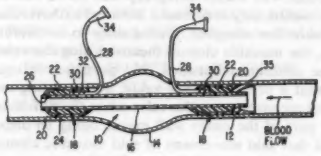
3,991,767
TUBULAR UNIT WITH VESSEL ENGAGING CUFF STRUCTURE

George E. Miller, Jr., Scramento; Paul Kahn, San Francisco, and William C. Dabney, Oakland, all of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.

Division of Ser. No. 412,355, Nov. 2, 1973, Pat. No. 3,889,685. This application Mar. 6, 1975, Ser. No. 556,185

Int. Cl.² A61M *25/00*

U.S. Cl. 128—348 **12 Claims**



1. A tubular unit with vessel engaging cuff structure for use within liquid conveying vessels of the body comprising a tube having at least one open end, at least one compressible cuff surrounding said tube and mounted on said tube, said cuff including a resilient, reticulated filler material having a network of fluid receiving interstices and a vessel engaging, flexible outer surface layer enclosing said filler material, said outer surface layer being formed of a material which is impervious to liquids and gasses, conducting means communicating with said filler material to facilitate the withdrawal of fluid therefrom to contact said cuff inwardly toward said tube from a normal expanded configuration assumed by said cuff when said fluid receiving interstices are filled with fluid, and vessel wall engaging means adapted to engage a vessel wall at a point spaced from the area of engagement of said cuff with the vessel wall, said vessel wall engaging means being mounted on said cuff adjacent one end thereof and being formed integrally with said cuff for contraction by said cuff when said cuff is contracted.

3,991,768

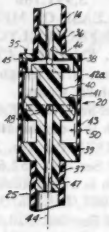
SHUNT SYSTEM RESISTANT TO OVERDRAINAGE AND SIPHONING AND VALVE THEREFOR

Harold D. Portnoy, 1431 Woodward Ave., Bloomfield Hills, Mich.

Continuation of Ser. No. 342,039, March 16, 1973, abandoned. This application June 25, 1975, Ser. No. 590,079

Int. Cl.² A61M *27/00*

U.S. Cl. 128—350 V **12 Claims**



1. A drainage system for draining body fluid from a cavity in the human body comprising in combination: a surgically implantable collector catheter to receive fluid to be drained; a surgically implantable discharge catheter to discharge fluid drained by the collector catheter; and a surgically implantable valve interconnecting said catheters, said valve comprising imperforate outer wall means forming a chamber means, a collector passage and a discharge passage entering the chamber means through the outer wall means and connected respectively to the collector catheter and to the discharge catheter, at least part of the outer wall means being elastic and flexible, a spacer means in said chamber means, the elastic and flexible part of said outer wall means being provided with movable closure means located inside said chamber means, which movable closure means is so constructed and arranged as to be movable toward the spacer means to coact therewith to prevent flow through the valve, and to move away from the spacer means to permit such flow, said elastic and flexible part of said outer wall means being exposed on its side inside the chamber means only to pressure from the catheters, and on its side outside the chamber means only to a reference fluid pressure, the movable closure means closing the valve to flow when the difference between said pressures is equal to or greater that a predetermined value, and standing away from the spacer means to open the valve when the difference is less, the said part of the outer wall means being so disposed and arranged that said movement of said movable closure means is accompanied by elastic action of said part.

3,991,769

RADIATION CONCENTRATOR DEVICE FOR MEDICAL-AESTHETICAL USE

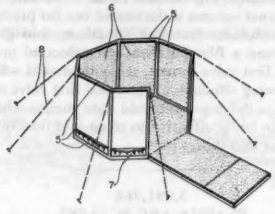
Carlos Fernandez-Sanguino Paz, Juan XXIII, 15-Huesca, Spain

Filed Apr. 7, 1975, Ser. No. 565,994

Int. Cl.² A61N *33/06*

U.S. Cl. 128—372 **4 Claims**

1. A radiation concentration device for medical-aestheticl use, comprising a series of reflective solar ray panels, each of said panels being substantially vertically disposed and adjacent to each other to form a prismatic casing, said panels being coupled about a surface defining a polygon shaped base, said base being reflective to solar rays, said casing being accesible through an opening located in one of the sides of said casing, a horizontally extending panel located at the bottom of said opening in alignment with said base of said casing, the base and the panels being rotatably mounted with respect to a supporting surface, each of said panels including a flexible tube which can be inflated to contain pneumatic pressure sufficient to support each panel in erect position, said panels further including reflective tissue, and said panels still further



including means for holding weights to add stability to said casing.

3,991,770

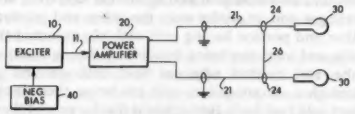
METHOD FOR TREATING BENIGN AND MALIGNANT TUMORS UTILIZING RADIO FREQUENCY, ELECTROMAGNETIC RADIATION

Harry H. LeVeen, 800 Poly Place, Brooklyn, N.Y. 11209

Continuation-in-part of Ser. No. 595,094, July 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 436,102, Jan. 24, 1974, abandoned. This application Dec. 23, 1975, Ser. No. 643,661

Int. Cl.² A61N *1/40*

U.S. Cl. 128—413 **4 Claims**



1. A method of treating a naturally occurring tumor in a human which comprises placing the portion of the body of the human in which the tumor is located in a radio frequency electromagnetic field thereby to heat the tumor tissue in said portion of said body by absorption of energy from said radio frequency electromagnetic field for a period of time and with intensity sufficient to cause necrosis of said tumor, but insufficient to cause significant damage to the adjacent normal tissue in said field.

3,991,771

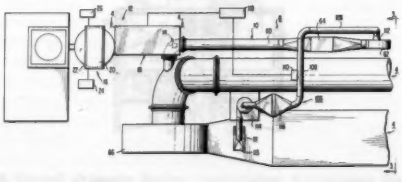
APPARATUS FOR DEPOSITION OF FLAVORANT VAPOR ON TOBACCO

Jon F. Banks, Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Feb. 11, 1975, Ser. No. 549,086

Int. Cl.² A24B *15/04*

U.S. Cl. 131—134 **16 Claims**



1. An apparatus including an air flow system into which tobacco is injected for treatment with a flavorant and with-

drawn after contact with said flavorant carried by said air flow system, comprising the improvement of:

a. means for vaporizing a molten flavorant into said air flow system including means for injecting said molten flavorant countercurrently into said air flow;

b. means operatively connected to said vaporizing means for regulating the quantity of flavorant injected into said air flow;

c. analyzing means in communication with said air flow downstream of said vaporizing means for analyzing the quantity of flavorant in said air flow; and

d. means operatively connected to said regulating means and said analyzing means for controlling said regulating means for varying the quantity of flavorant injected in response to the quantity of flavorant in the air flow analyzed by said analyzing means.

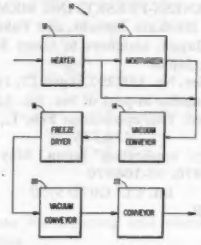
3,991,772
METHODS OF AND APPARATUS FOR EXPANDING TOBACCO

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Division of Ser. No. 321,226, Jan. 5, 1973, which is a continuation of Ser. No. 78,809, Oct. 7, 1970, abandoned. This application Aug. 14, 1973, Ser. No. 388,271

Int. Cl.² A24F *3/18*

U.S. Cl. 131—138 **8 Claims**



8. Apparatus for expanding tobacco, which comprises: means for heating and/or increasing the moisture content of tobacco to increase the elasticity of the walls of the cells of said tobacco; casing means in which said tobacco can be isolated from the ambient surroundings; means for reducing the pressure on the tobacco isolated in said casing means to a level sufficiently low to convert a part of the moisture in said tobacco into vapor and increase its volume to thereby expand the size of the tobacco cells; means for supplying steam to the casing means in which the pressure on the tobacco is reduced to thereby keep the walls of the tobacco cells elastic and to keep the moisture content of the tobacco at an acceptably high level; means operable while said tobacco is still isolated from the ambient surroundings in said casing means as aforesaid for further reducing the pressure on said tobacco sufficiently low to freeze said tobacco and thereby inhibit it against shrinking toward its unexpanded configuration; and means for thereafter drying said tobacco in vacuo, whereby the moisture content of said tobacco can be reduced without significant shrinkage in the size of said cells.

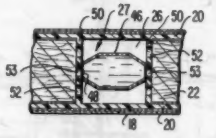
3,991,773
OPTIONAL DRY OR LIQUID FILTER

Eric E. Walker, 1108 NE. 16th St., Fort Lauderdale, Fla. 33304

Division of Ser. No. 324,123, Jan. 16, 1973, Pat. No. 3,884,246. This application Feb. 20, 1975, Ser. No. 551,429

Int. Cl.² A24B *15/02*

U.S. Cl. 131—264 **10 Claims**



1. A tobacco smoke filter element comprising:

a resilient water impervious elongated tubular casing having a porous plug of filter material disposed at each end of said casing;

opposed mutually spaced disc-like walls disposed within said casing between said plugs, one wall abutting the inner surface of each plug, said walls defining a chamber within the central portion of said casing and having at least one port in each wall;

at least one liquid containing module formed of brittle, water impervious material, disposed within said chamber and extending between said walls, said module configured to define with the ports in said walls at least one passage for smoke through said filter element;

means carried by said element and cooperating between said module and at least one port in each of said walls for directing liquid from said module through the ports into said plugs responsive to compression of the external walls of said chamber so that said plugs may act selectively as a dry filter or, when said casing is compressed, as a filter moistened by said liquid.

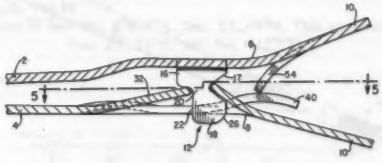
3,991,774
HAIR CLIP WITH LEAF SPRING HINGE

Maurice Wolfthal, Ossining, N.Y., assignor to Stewart Stamping Corporation, Yonkers, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,000

Int. Cl.² A45D *8/24*

U.S. Cl. 132—48 R **11 Claims**



1. A hair clip comprising:

a first elongated member having a clip portion and a handle portion;

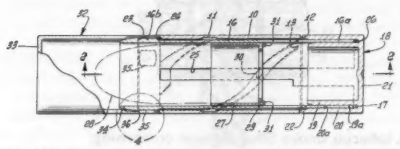
a second elongated member having clip and handle portions corresponding to said upper member's clip and handle portions;

means for pivotally securing said first member to said second member comprising a pair of ears extending from said first member in the vicinity of said handle portion, each ear being captured in a slot defined in one of a pair of corresponding gaps formed in said second member; and

spring means operatively associated with said members for exerting a continual moment about said pivot means

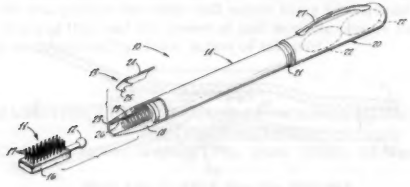
whereby said clip portions are normally urged to a closed position.

3,991,775
COSMETIC APPLICATOR
Walter B. Spatz, Pacific Palisades, Calif., assignor to Spatz Corporation, Venice, Calif.
Filed Feb. 24, 1975, Ser. No. 552,044
Int. Cl.² A45D 40/00
U.S. Cl. 132—79 C 11 Claims



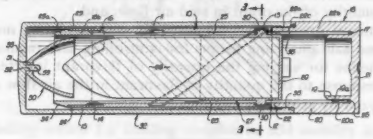
1. A cosmetic applicator comprising an elongate outer tubular member having internal helical thread means, an elongate carrier sleeve structure within said member having a rear base portion extending rearwardly beyond said member and an extension portion extending forwardly beyond the forward end of said member, said sleeve structure having a longitudinal slot, a cosmetic holder slidable longitudinally within said sleeve structure and having key means extending through said slot into mesh with said helical thread means, whereby relative turning between said tubular member and sleeve structure shifts said holder forwardly and rearwardly in said sleeve structure, and a cap mounted on and releasably secured to said extension portion, the rear end of said cap terminating forwardly of the forward end of said tubular member.

3,991,776
EJECTOR TOOTHBRUSH
Lawrence Edward Duffy, 2127 W. Chateau Ave., Anaheim, Calif. 92804
Filed Dec. 8, 1975, Ser. No. 638,592
Int. Cl.² A45D 44/18
U.S. Cl. 132—84 R 4 Claims



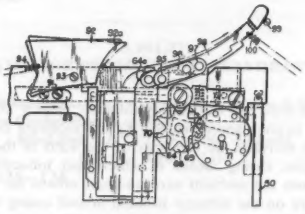
1. A toothbrush assembly, comprising:
handle means having first and second, opposite ends and a hollow interior portion;
brush means having an end of suitable dimensions for insertion via said first end into the interior of said handle means;
a spring latching mechanism mounted to said handle means and comprising (1) a spring within said interior portion for engaging and being compressed by said brush end upon insertion of said brush end into the interior portion of said handle and (2) a detent pivotally mounted on said handle for releaseably engaging said brush end opposite said compressed spring to retain said brush end against said spring.

3,991,777
COSMETIC APPLICATOR
Ronald J. Powers, 109 S. Poinsettia St., Manhattan Beach, Calif. 90266, and John M. Van Zandt, 701 E. Medio Drive, Pacific Palisades, Calif. 90272
Filed Dec. 8, 1975, Ser. No. 638,900
Int. Cl.² A45D 40/26
U.S. Cl. 132—88.7 14 Claims



1. A cosmetic applicator comprising an enclosure adapted to contain a cosmetic mass, means in said enclosure for effecting forward and rearward movements of the cosmetic mass within the enclosure to extend the mass beyond the forward end of the enclosure and to retract the mass within the enclosure, a transparent cap disposable over the enclosure to protect the mass and removable from the enclosure when the cosmetic mass is to be used, and a dummy member within and secured to the cap to protect the cosmetic mass when the cap is disposed over the enclosure.

3,991,778
COIN-PROCESSING DEVICE FOR SORTING AND PROCESSING VARIOUS SIZED COINS HAVING A DIAMETER-PRESETTING MEMBER AND AT THICKNESS-PRESETTING MEMBER
Masatoshi Ushio; Hisakazu Ikeuchi, and Yukinobu Nakajima, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan
Continuation of Ser. No. 355,297, April 27, 1973, abandoned, which is a continuation-in-part of Ser. No. 144,577, May 18, 1971, abandoned. This application Feb. 1, 1974, Ser. No. 438,775
Claims priority, application Japan, May 19, 1970, 45-42581; Dec. 3, 1970, 45-106970
Int. Cl.² G07D 9/00
U.S. Cl. 133—8 R 4 Claims



1. A coin-processing device for sorting coins of different sizes, comprising:
an adjustable coin passageway for edgewise passage of coins therethrough;
a diameter-presetting member for adjustably presetting a cross-section of said passageway;
first control means including a first turnable cam member adapted for positioning said diameter-presetting member to a position corresponding to the coin diameter;
coin drive-transferring means for driving coins charged into said passageway along the passageway;
a movably mounted frame member;

a driving shaft for driving said coin drive-transferring means and supported by said frame member;

second control means including a second turnable cam member adapted for positioning said coin drive-transferring means to a position corresponding to the denomination of the coins to be processed; and

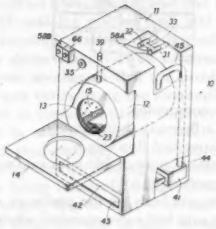
a single manual coin selecting section including a coin selecting shaft for selecting a coin of a particular kind to be processed, and said first and second cam members being coupled with said selecting shaft and having cam surfaces corresponding respectively to differing kinds of coins to be processed, whereby when said shaft is rotated by a predetermined angle for selecting a coin of a particular kind to be processed, said first and second cam members are rotated by a predetermined angle thereby to cause engagement of said cam surfaces with said diameter-presetting member and said frame member, thus causing presetting of said diameter-presetting member and said coin drive transferring means to respective positions corresponding to the diameter and thickness of said coin of a particular kind.

3,991,779

MEDICAL EQUIPMENT CLEANING SYSTEM

Dean Saurenman, Pearland, Tex., assignor to Del Tek, Inc., Houston, Tex.

Filed Apr. 19, 1974, Ser. No. 462,299
Int. Cl.² B08B *3/06*
U.S. Cl. 134—57 R **6 Claims**



1. An apparatus for cleaning and disinfecting medical equipment including

enclosure means for receiving and retaining a cleaning and disinfecting solution, said enclosure means including a drum rotatably mounted with respect to a horizontal axis, means in said drum for releasably retaining medical parts fixed with respect to said drum,

means for supplying temperature controlled water for a cleaning and disinfecting solution to said enclosure means including a hot and cold inlet supply means and a common discharge means from said supply means to said enclosure means, and

means in said discharge means for sensing the temperature of water therein and for regulating the flow of water through one of said hot and cold inlet supply means for controlling the temperature of the inlet water.

6. An apparatus for cleaning and disinfecting medical equipment including

enclosure means for receiving and retaining a cleaning and disinfecting solution, said enclosure means including a drum rotatably mounted with respect to a horizontal axis, means in said drum for releasably retaining tubular members in a circular configuration about said horizontal axis, said retaining means including negator type springs circumferentially spaced about said drum,

means for supplying water for a cleaning and disinfecting solution for said enclosures, and

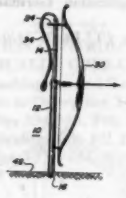
means for rotating said drum about said horizontal axis.

3,991,780

COMBINATION ARCHERY BOW STAND, WALKING CANE AND ANIMAL DRAGGING DEVICE

Frank M. Maroski, Jr., R.D. 2 Box 381, Bath, Pa. 18014

Filed Feb. 10, 1976, Ser. No. 656,830
Int. Cl.² A45F *3/44*; **A45B** *1/00*, *5/00*
U.S. Cl. 135—66 **10 Claims**



1. A combination archery bow stand, walking cane, and animal dragging device comprising

a first elongated member;

a second elongated member having an end thereof engaged and adapted to reciprocate axially with respect to said first member;

means coupled to one of said members for axially affixing said member together in fixed relationship;

first support means affixed intermediate the ends of said first member and extending perpendicular to the principal axis of said first member;

second support means affixed to the non-engaged end of said second member and extending outwardly parallel to said first support means and bent inwardly toward said first support means, said second support means providing the various functions of a handle for a walking cane and a hook for hanging said combination on a protuberance, both said support means providing the function of providing engagements for supporting an archery bow;

a ring affixed to said second support means and said second member; and

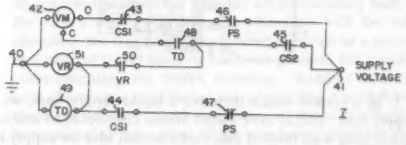
a rope having one end affixed to said ring.

3,991,781

APPARATUS FOR AND METHOD OF AUTOMATICALLY CLEANING AN OBSTRUCTED VALVE

Roderick M. Willis, 2624 W. Crockett St., Seattle, Wash. 98199, and Charles L. Oldfather, 8812 40th SW., Seattle, Wash. 98116

Division of Ser. No. 536,974, Dec. 23, 1974. This application Nov. 17, 1975, Ser. No. 632,278
Int. Cl.² F16K *51/00*
U.S. Cl. 137—15 **8 Claims**



1. A method of cleansing an obstructed valve comprising:

sensing the presence and absence of an obstruction within said valve;

opening said valve in response to said obstruction being sensed as present; and

closing said valve to a predetermined position after a predetermined period of time has elapsed from when said obstruction has been sensed as absent.

3,991,782

ATTENUATION OF A CLOSING FLAP FOR A SECONDARY AIR INTAKE OPENING IN AN AIRCRAFT ENGINE

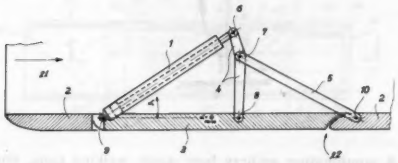
Hans Jürgen Schwärzler, Taufkirchen, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker Gesellschaft mit beschrankter Haftung, Bremen, Germany

Filed Feb. 17, 1976, Ser. No. 658,260

Claims priority, application Germany, Mar. 15, 1975, 2511468

Int. Cl.² B64D *33/02*

U.S. Cl. 137—15.1 **6 Claims**



1. In an air intake duct for aircraft engines and having a primary and a secondary air-intake opening, a construction for opening and closing the secondary air intake opening comprising:

a flap means hinged to the duct for opening and closing the secondary opening;

a shock attenuating device having a reciprocating element and being hinged with one end to the duct wall close to a point of hinging said flap means; and

lever means hinged to the other end of the device and to the flap means for causing the element to reciprocate with a larger stroke length for a closing or nearly closing flap means position than for a fully open flap means position, so that the device provides for stronger attenuation of movement of the flap means when in the closing or nearly closing position than for the fully open position.

3,991,783

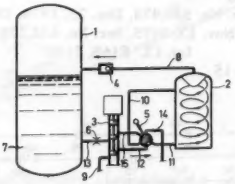
SYSTEM FOR RAPIDLY BUILDING AN AIR CUSHION OVER LIQUID IN A TANK

Hans Krauss, Jakob-Bleyer-Weg 13, 7920 Heidenheim (Brenz), Germany

Continuation-in-part of Ser. No. 335,156, Feb. 23, 1973, abandoned. This application June 27, 1975, Ser. No. 591,110

Int. Cl.² E03B *5/00*

U.S. Cl. 137—209 **10 Claims**



1. In a system which includes a liquid-supply tank, an air-supply tank, and an air-conduit means connected to and communicating with both of said tanks so that said air-supply tank may be cyclically operated at a given normal cyclical rate for maintaining an air cushion over liquid in the liquid-supply tank during normal operation of the system while the air-supply tank may be operated at a cyclical rate faster than said normal rate to rapidly build up the air cushion in the liquid-supply tank under conditions where the liquid-supply tank is initially installed, or is set up for operation after inspection, repairs, or the like, a pair of lower pipes respectively communicating with both of said tanks and each situated at an elevation lower than said air-conduit means, a liquid-supply tank discharge pipe, an air-supply tank dishcarge pipe, and control valve means having a high pressure position and a low pressure position, said valve means being operatively connected to and communicating with said lower pipes and said discharge pipes for placing said lower pipe of said liquid-supply tank in communication with said liquid-supply tank discharge pipe and said lower pipe of said air-supply tank in communication with said air-supply tank discharge pipe when said valve means is in said high pressure position thereof and for placing said lower pipes in communication with each other while terminating communication between said lower pipes and discharge pipes when said valve means is in said low pressure position thereof.

3,991,784

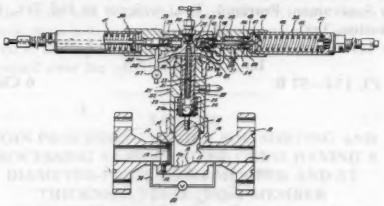
HIGH/LOW SAFETY VALVE

John C. Gano, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed May 5, 1975, Ser. No. 574,579

Int. Cl.² F16K *17/00, 25/00*

U.S. Cl. 137—458 **4 Claims**



3. A ball valve comprising;

a body having a flowway therethrough,

a valve seat across said flowway,

a ball valve member cooperable with said seat for controlling flow therethrough,

a ball pocket in said body on the upstream side of the seat for receiving said ball valve member when the valve is in open position,

a valve operator,

an inclined surface in the flowway in the path of travel of the ball valve member as it moves toward closed position to direct the ball valve member toward the seat,

said valve operator including,

a pressure responsive member connected to said articulating means,

a high pressure pilot,

a low pressure pilot,

means conducting pressure fluid from said valve body upstream of said seat to both said high and low pressure pilots,

means conducting fluid from said high and low pressure pilots to pressure responsive means to close said ball valve member in the event of opening of either of said high or low pressure pilots.

3,991,785

FLOW REGULATOR VALVE

Joseph C. Trinkwalder, Jr., North Tonawanda, N.Y., assignor to Sherwood-Selpac Corporation, Lockport, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,505

Int. Cl.² F16K *31/12*

U.S. Cl. 137—494 **7 Claims**

1. A fluid flow regulator comprising:

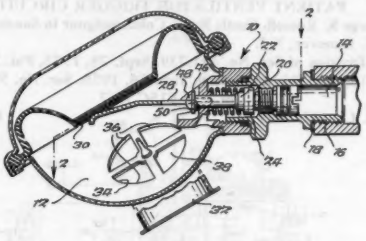
a main body having a chamber therein, an inlet means to said chamber, and a fluid discharge means from said chamber,

a valve seat means in said chamber, said valve seat means being in communication with said inlet means for receiving fluid from a fluid supply,

a valve means in said chamber, said valve means including a valve head means supported within said chamber for movement to and from said valve seat means to respectively block and unblock fluid flow through said inlet means,

biasing means for normally urging said valve head against said valve seat to block fluid flow, and

valve actuator means coupled to said valve means for selectively moving said valve means to block and unblock fluid flow, said valve actuator means including at least one pivoted leg portion for providing movement to said valve means and a mounting means disposed on said main



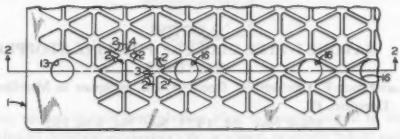
body, said mounting means receiving said leg portion in pivoted contact thereagainst and one of the contacting surfaces of said leg portion and said mounting means being of curvilinear shape and the other being of relatively flat shape when viewed in cross-section with respect to one another so that the pivot point of contact therebetween varies along the longitudinal length of said leg portion in correspondence to pivoted movement experienced by said leg portion whereby said leg portion provides correspondingly various degrees of mechanical advantage for moving said valve means, said mechanical advantage being relatively the greatest when said valve means is initially moved away from said valve seat means and being relatively less as said valve means is moved farther away from said valve seat means.

3,991,786

FLUID CIRCUIT PLATE FOR A CIRCUIT MODULE FOR FLUID DISTRIBUTION

Paul E. Olson, Lexington, Ky., assignor to American Standard, Inc., New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,556
Int. Cl.² F15B *13/02*
U.S. Cl. 137—561 R **11 Claims**



1. For use as a component in a fluid pressure distribution circuit module, a fluid circuit plate comprising:

a. a plate member,

b. a plurality of thin-walled partitions on said plate member defining a plurality of polygonal chambers, and wherein the improvement comprises;

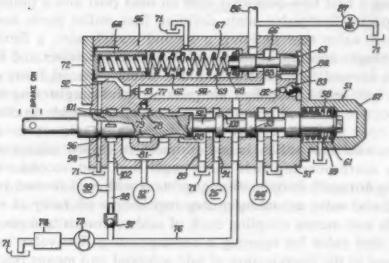
c. a plurality of pairs of strengthening posts, each pair of posts being integral with the respective opposite ends of one of said plurality of partitions, and each post of each pair of posts being also integral with one end of several other partitions extending radially therefrom, the opposite end of each of said several other partitions being intergal with another post whereby each pair of posts is effective to render the respective partition having its opposite ends integral with this pair of posts selectively severable therefrom without damaging another partition extending radially from either one of this pair of posts.

3,991,787

MODULATION CONTROL VALVE FOR HYDRAULICALLY OPERATED WINCH

James L. Schmitt, Washington, and David S. Ohaver, Canton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 334,353, Feb. 21, 1973, Pat. No. 3,841,608. This application July 15, 1974, Ser. No. 488,703
Int. Cl.² F15B *13/06*
U.S. Cl. 137—596.13 **7 Claims**



1. A modulating control valve for releasing a normally engaged brake means while simultaneously engaging a normally disengaged clutch means and for selectively releasing the normally engaged brake means, comprising:

a source of fluid under pressure;

a valve body defining an inlet chamber in communication with the fluid source and a bore, the bore being in communication with the inlet chamber, an actuating chamber for releasing the brake and an actuating chamber for engaging the clutch;

a regulating spool movably arranged in the bore with resilient means urging the regulating spool into a centered position in the bore wherein the spool communicates the clutch and brake chambers with a fluid drain, the regulating spool being movable in a first direction of travel from its centered position for variably communicating both of the clutch and brake actuating chambers with the inlet chamber, the regulating spool being movable in a second direction of travel from its centered position for variably communicating the brake actuating chamber with the inlet chamber; a modulating valve including a modulating spool and an associated load piston continuously effective in response to movement of the regulating spool for providing a pressure modulating variable outlet from the inlet chamber to thereby vary the pressure in the outlet chamber; and

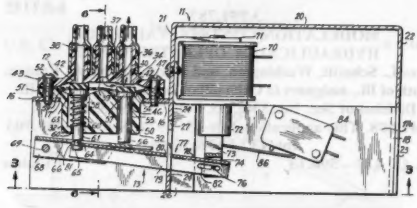
an accumulator means interconnected with the inlet chamber by means of a check valve and interconnected with the regulating spool bore, the regulating spool being effective to communicate the accumulator means with the brake actuator chamber as the regulating spool is moved from its centered position.

3,991,788

FLUID FLOW DISTRIBUTOR FOR MULTI-CHOICE VENDING MACHINE

Leo Kull, West Caldwell, N.J., assignor to Coffee-Mat Corporation, Kenilworth, N.J.

Filed Aug. 28, 1975, Ser. No. 608,520
Int. Cl.² F16K 11/18
U.S. Cl. 137—608 13 Claims



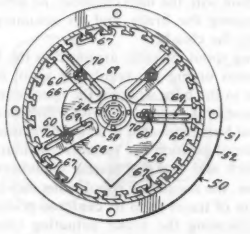
1. A fluid distributor device comprising a head member having a first face provided with an inlet port and a plurality of spaced first valve seats defining first outlet ports and a second valve seat defining a second outlet port, a flexible diaphragm hermetically sealed to said head member and having a second face confronting and axially spaced from said first face and having first and second valves registering with respective first and second valve seats and movable to closed and open positions engaging and disengaging respective valve seats, said first valves being normally in closed engagement with corresponding first valve seats and said second valve being normally in open disengagement with said second valve seat, and valve actuating means including a plurality of solenoids and means coupling each of said solenoids to a respective first valve for opening a corresponding first valve in response to the energization of said solenoid and means responsive to the opening of one of said first valves for closing said second valve.

3,991,789

INFINITELY ADJUSTABLE CYCLIC TIMING DEVICE

Richard J. Wojcikowski, Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio

Filed Mar. 31, 1975, Ser. No. 563,324
Int. Cl.² G01D 5/44, 5/36
U.S. Cl. 137—624.2 8 Claims



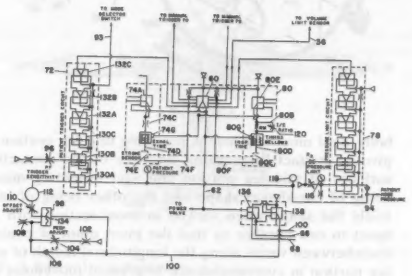
1. An adjustable dwell cyclic timing device comprising, in combination, a timing element having a center of rotation and a timing surface with a continously changing radius from the center of rotation which for increasing angles in a predetermined direction around the center of rotation increases spirally from a minimum radius to a maximum radius and then decreases from the maximum radius back to the minimum radius, means for rotating said timing element about the center of rotation in synchronism with a timing cycle, at least one sensing means for generating a pulsed timing signal in response to sensing the presence and absence of said timing surface, means for mounting said sensing means for sensing the presence and absence of said timing surface at a predetermined point spaced from said sensing means and in the path of rotation of said element, such predetermined point lying in the region between the minimum and maximum radii of the rotating timing surface, and means for changing the location of said predetermined point within such region to adjust the point of occurrence of the timing signal to substantially any predetermined point in the timing cycle and to adjust the pulse duration of the generated timing signal to a predetermined duration ranging from substantially 0° to substantially 360° rotation of said timing surface.

3,991,790

PATIENT VENTILATOR TRIGGER CIRCUIT

George K. Russell, Castle Rock, Colo., assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 401,739, Sept. 28, 1973, Pat. No. 3,916,889. This application June 26, 1975, Ser. No. 590,616
Int. Cl.² F15C 1/12
U.S. Cl. 137—819 1 Claim



1. A patient trigger circuit for use in a ventilator apparatus comprising first, second, and third fluidic circuits each consisting of a proportional amplifier, and fourth, fifth and sixth fluidic circuits each consisting of a flip flop circuit, each said fluidic circuit having a pair of input ports and a pair of output ports, wherein the output ports of said first through fifth fluidic circuits are connected to the input ports of the next succeeding circuit; the output ports of said sixth fluidic circuit provide trigger circuit output signals; one of said input ports of said first fluidic circuit is connected to a source of control input signals; and the other input port of said first fluidic circuit is connected to a source of reference signals; and wherein said second fluidic circuit includes a second pair of input ports for connection respectively to a source of reference bias pressure, and to a source of sensitivity signals.

3,991,791

BAYONET-TYPE CLOSURE FOR LINE STOPPER FITTINGS

Lawrence F. Luckenbill, Decatur, Ill., assignor to Mueller Co., Decatur, Ill.

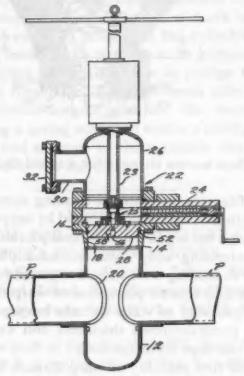
Filed Nov. 24, 1975, Ser. No. 634,752
Int. Cl.² F16L 55/10, 55/16
U.S. Cl. 138—94 9 Claims

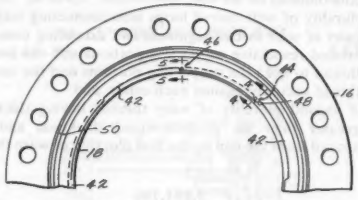
1. An assembly for closing a side opening in a fluid pressure pipe comprising:

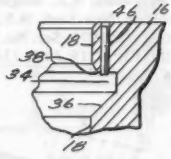
a fitting attached to said pipe around the said opening and having at least an annular portion with a cylindrical bore, the annular portion terminating in a free end, said annular portion having a counterbore in said cylindrical bore adjacent to and spaced from the free end to define an annular groove, said annular portion outwardly of said groove having spaced arcuate cutouts extending inwardly

in said bore from said free end of said annular portion and communicating with said groove;

a completion plug arranged to be received in said cylindrical bore, said completion plug having spaced arcuate lugs on its periphery having an axial width less than an axial width of said annular groove and a circumferential extent less than the circumferential extent of said cutouts whereby said completion plug can be inserted into said cylindrical bore with said lugs passing through said cutouts into said groove and then rotated to provide a bayonet-type fastening and to permit said completion plug to have limited axial movement when said lugs are in said groove and pressure across said completion plug is equalized;







valve means in said completion plug normally urged to the closed position and operable to open position when said completion plug is being inserted or removed;

a first stop means in said groove to engage at least one of said completion plug during insertion;

a second stop means in said groove normally out of the path of said lugs when said completion plug is being rotated during insertion or removal and extending into the path of at least one of said lugs when said completion plug has been moved outwardly by pressure of fluid in said pipe after insertion and rotation so as to cooperate with said first stop means to prevent removal of said completion plug without equalizing pressure on both sides of said completion plug; and,

sealing means between said plug and said fitting, said sealing means being positioned below said lugs.

3,991,792

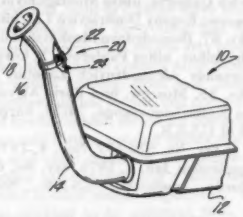
ANTI-SIPHON GASOLINE TANK

William C. Kettler, 1049 W. Cass Ave., Flint, Mich. 48505

Filed Feb. 3, 1975, Ser. No. 546,258

Int. Cl.² F16L *55/00*

U.S. Cl. 138—108 **4 Claims**



1. In combination with a fuel tank of the type having an open elongated neck communicating with a fuel storage compartment, means for preventing the siphoning of fuel from the fuel tank, comprising:

a. an annular seat formed in the neck,

b. a coiled spring disposed in the seat of the neck of the fuel tank,

wherein the annular seat has a width slightly larger than the width of the coiled spring to prevent the removal of the spring from the seat.

3,991,793

ECCENTRIC DRIVE FOR A DOBBY

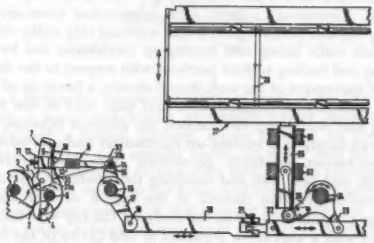
Hans Demuth, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 11, 1975, Ser. No. 603,386

Claims priority, application Switzerland, Aug. 12, 1974, 10998/74

Int. Cl.² D03C *5/00*

U.S. Cl. 139—79 **9 Claims**



1. An eccentric drive for driving a heddle carrying frame in a weaving machine, said drive comprising

at least one frame actuating linkage;

a spindle;

a double-armed deflecting lever pivotally mounted on said spindle and connected at one end to said frame actuating linkage to reciprocate said linkage in response to pivoting of said lever;

a pivotally mounted lever; and

a link having one end pivotally mounted on one of said deflecting lever and said pivotally mounted lever about a

pivot axis and having an opposite end secured to the other of said deflecting lever and said pivotally mounted lever at one of a plurality of points on a curved adjusting line, said line having a center of curvature located away from said pivot axis whereby said line deviates from a circular arc having a center of curvature coincident with said pivot axis when said drive is in a bottom-shed position.

3,991,794

WEFT THREAD SHUTTLE FOR TRAVELLING WAVE SHEDDING LOOMS

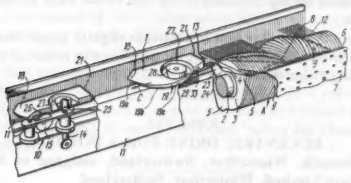
Alexandr Lvovich Galperin, ulitsa Moldagulovoi, 10, korpus 2, kv. 166, Moscow; Evgeny Dmitrievich Loschilin, Kashirskoe shosse, 36, kv. 87, Domodedovo Moskovskoi oblasti; Eduard Arshakovich Onikov, ulitsa Panferova, 5, korpus 2, kv. 106, Moscow; Alexandr Alexandrovich Zabotin, Profsojuznaya ulitsa, 96, kv. 85, Moscow, and Boris Alexandrovich Sakharov, ulitsa Krzhizhanovskogo, 24/35, korpus 6, kv. 404, Moscow, all of U.S.S.R.

Continuation of Ser. No. 520,477, Nov. 4, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,416

Claims priority, application U.S.S.R., Nov. 26, 1973, 1971638

Int. Cl.² D03D *47/26;* **D03J** *5/00*

U.S. Cl. 139—196.3 **4 Claims**



1. A weft thread shuttle for travelling-wave shedding looms movable in a shed of the loom along a beating-up mechanism thereof comprising: a body of a trapezoidal cross-section having top and bottom sides, a rear wall and side walls; one of said side walls facing said beating-up mechanism and having leading and trailing surface portions with respect to the direction of movement of the weft thread shuttle; a bevel tip of said body smoothly conjugated with said side wall of the body facing said beating-up mechanism, the distance between said side wall facing said beating-up mechanism and said beating-up mechanism gradually decreasing from said bevel tip towards said rear wall and assuming the smallest value at an intermediate portion thereof in the region of said trailing surface portion; a cavity in the body on the top side thereof; a spool with a weft stock mounted in said cavity of the body; means for tensioning the weft thread paid-off from said spool during its laying-in in said shed in face of the beating-up mechanism, said means being accommodated adjacent to the rear wall of the body and spaced apart from said beating-up mechanism at a distance not exceeding the spacing therefrom of said tip of the body; said leading and trailing surface portions of said side wall facing said beating-up mechanism being respectively arranged at greater and smaller acute angles with respect to an imaginary line extending in parallel with the direction of the shuttle in the shed and said side wall having a height gradually increasing from said tip towards the rear of the body and having a maximum height at said intermediate portion.

3,991,795

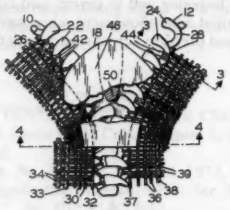
BEADLESS WOVEN STRINGER FOR A SPIRAL SLIDE FASTENER

David C. Bainer, Meadville, Pa., assignor to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 343,078, March 20, 1973, abandoned. This application Apr. 16, 1975, Ser. No. 568,575

Int. Cl.² D03D *3/00;* **A44B** *19/12*

U.S. Cl. 139—384 B **11 Claims**



1. A beadless woven stringer for a spiral slide fastener comprising

a coil of filamentary material forming successive convolutions with locking portions joined by supporting portions,

a woven tape having first and second pluralities of longitudinally extending warp threads and a plurality of transversely extending weft thread segments interwoven with the first and second pluralities of warp threads,

said first plurality of warp threads having thicknesses less than a predetermined thickness and extending side by side in the tape from the coil,

one of said first plurality of warp threads being on the one edge of the tape and being the only warp thread in engagement with the supporting portions of succeeding convolutions of the coil,

a plurality of weft thread loops interconnecting respective pairs of weft thread segments and extending completely around respective supporting portions and the one warp thread to hold the supporting portions and the one warp thread securely against each other, and

said second plurality of warp threads having thicknesses greater than the predetermined thickness and being spaced from the coil by the first plurality of warp threads.

3,991,796

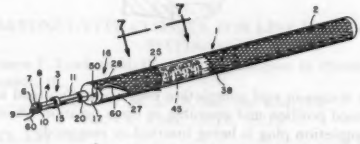
WIRE CUTTING, STRIPPING AND WRAPPING HAND TOOL

Jaroslav Dvorak, Ringwood, N.J., assignor to O.K. Machine and Tool Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,352

Int. Cl.² B21F *3/00, 15/04*

U.S. Cl. 140—124 **7 Claims**



1. A hand-operated tool for cutting insulated wire, stripping insulation from a portion thereof, and wrapping the stripped portion on a terminal, comprising an elongated member comprising a generally cylindrical handle end having a central bore, an elongated shank having one end engaging the handle bore and secured to the handle for rotation therewith, a strippng and wrapping head including insulation stripping means for receiving the insulated wire and for cutting through

the insulation whereby when the wire is pulled through the stripping means during the wrapping process the cut insulation is stripped from the wire, said head further including wire wrapping means comprising a bore for receiving the terminal and means adjacent the bore for wrapping the wire around the terminal when said head is rotated, means securing the stripping and wrapping head to the opposite end of the elongated shank, and a wire cutting mechanism, said wire cutting mechanism comprising a fixed element and a rotatable element together aligned to form an exposed cutting slot for receiving the insulated wire and cooperating when the rotatable element is rotated relative to the fixed element to shear through the wire when placed in the cutting slot, said fixed cutter element comprising an enlarged collar on the elongated shank located between its ends, said rotatable cutter element comprising a sleeve rotatably mounted on the elongated shank between and adjacent the said enlarged collar and the cylindrical handle, said sleeve being located in a position to be gripped by a user, and means providing a restoring force to realign the position of the fixed and rotatable cutting elements after they have been rotated relative to one another, the restoring force means comprising a spring mounted within a cavity of the tool and having one end secured to the rotatable sleeve and the other end secured to the handle.

3,991,797
RINSING DEVICE FOR CIRCULATING ONE-CHAMBER VESSEL FILLING MACHINES

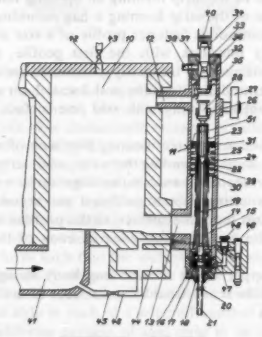
Gerhard Uth, Bad Kreuznach; Heinrich Zeimet, Bingen-Budesheim, and Alfred Rentel, Ban Kreuznach-Winzenheim, all of Germany, assignors to Seitz-Werke GmbH, Bad Kreuznach, Germany

Continuation-in-part of Ser. No. 391,472, Aug. 24, 1973, abandoned, which is a continuation of Ser. No. 186,105, Oct. 4, 1971, abandoned. This application Nov. 29, 1974, Ser. No. 528,505

Claims priority, application Germany, Oct. 3, 1970, 2048741

Int. Cl.² B08B *9/00*; **B65B** *3/04*

U.S. Cl. 141—91 **6 Claims**



1. In combination with a vessel filling machine of the one-chamber type having a plurality of filling elements for individual vessels, a filling container having first conduit means leading from said filling container to each of said filling elements respectively and gas supply means structurally connected to feed a gas to each of said filling elements, second conduit means leading from said filling container to each of said filling elements respectively and liquid supply means structurally connected to said second conduit means to feed a liquid to each of said filling elements, further conduit means connected to said filling container for feeding fluid means thereto, cover means closing the top of each of said filling elements, each of said filling elements respectively being provided with pressure relief conduit means for relieving the individual vessels internally to be filled by the vessel filling machine, annular passage means common to all of said filling elements, third conduit means for respectively establishing communication between said pressure relief conduit means in each of said filling elements and said annular passage means, said machine being constructed for rinse-cleaning in that the top of said filling container is formed with a first outlet and shut-off valve means are associated with said first outlet for controlling the same, said filling container being adapted to be filled with cleaning fluid through said further conduit means connected to said container, each of said cover means having a further outlet means for conveying fluid from the interior of said filling elements to an exhaust, built-in control valve means arranged within said cover means for controlling said further outlet means, so that said cleaning fluid means may pass out through said exhaust when said built-in control valve means is opened, fourth conduit means leading from said annular passage means to said further conduit means, and control valve means arranged in said fourth conduit means for controlling communication between said further conduit means and said annular passage means, and valve actuation cam means for opening said built in control valve means, and a relief valve means in said pressure relief conduit means respectively, whereby said cleaning fluid is adapted to be admitted from said annular passage means to said pressure relief conduit means for flushing said relief conduit means when said relief valve means is opened.

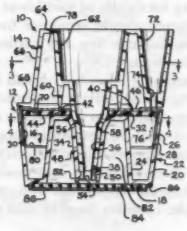
3,991,798
DISPOSABLE DEVICE FOR SHARPENING LEADS OR THE LIKE

Robert M. Grosjean, 4625 Merry Lane, Toledo, Ohio 43615

Filed Sept. 19, 1975, Ser. No. 615,052

Int. Cl.² B43L *23/00*

U.S. Cl. 144—28.1 **16 Claims**



1. A device for sharpening points of leads or the like comprising a lower unit having an annular cavity opening upwardly and a central passage, means forming an abrasive surface adjacent said annular cavity, an upper unit having a central axle extending downwardly through said passage and having integral means at the lower end cooperating with integral means associated with said passage to enable said upper unit to rotate relative to said lower unit but to prevent said upper unit from being separated from said lower unit, said upper unit having means spaced from said axle and positioned over said abrasive surface means for receiving a lead.

3,991,799
APPARATUS AND METHOD OF FELLING AND BUNCHING TREES

Alva Z. Albright, 2909 Monroe Highway, Pineville, La. 71360

Filed Apr. 21, 1975, Ser. No. 569,627

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 R **8 Claims**

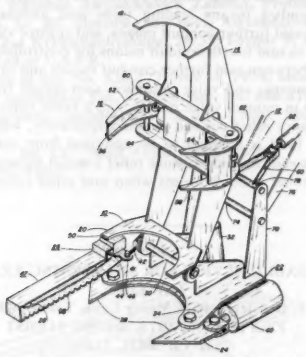
1. An improved apparatus for felling and bunching trees, said apparatus being mountable by attaching means fixed with

an hydraulic cylinder to the forward end of a power train having an auxiliary hydraulic power system, and comprising:

a. an horizontally articulated upright structure having upper and lower parts pivotally joined end-to-end, said upper part being adapted to pivot rearwardly and forwardly on said lower part;

b. hydraulic cylinder means connected between said upper and lower parts of the horizontally articulated upright structure and to said auxiliary hydraulic power system for actuating said pivoting;

c. tree gripper assembly means fixed to and extending forwardly of said upper part of the horizontally articulated upright structure for gripping and releasing trees, and, in cooperation with the aforesaid upright structure bending trees rearwardly;



d. stump gripper and chain saw and sheath assembly fixed to and extending forwardly of said lower part of the horizontally articulated upright structure for anchoring said improved apparatus to a tree and cutting said tree rearwardly as it is so bent;

e. a connecting assembly mounted on said lower part of the horizontally articulated upright structure and comprising parallel uprights adapted to support an upper horizontal support bar and a lower horizontal support bar for said lower horizontal support bar to be pivotally engaged by said attaching means fixed to said power train, and for said upper horizontal support bar to be pivotally engaged by said hydraulic cylinder fixed to said power train.

3,991,800

LOG DE-BARKING MACHINE

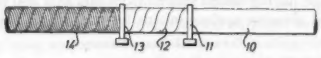
Harry Oskar Palmquist, Soderhamn, Sweden, assignor to Kockum Industri Aktiebolag, Sweden

Filed July 1, 1974, Ser. No. 484,765

Claims priority, application Sweden, July 4, 1973, 7309398

Int. Cl.² B27L *1/00*

U.S. Cl. 144—208 E **1 Claim**



1. A log debarking machine, comprising in combination:

a. a frame;

b. a first feed unit supported on said frame for infeeding a log;

c. a first hollow-rotor-type processing unit on said frame and having tools adapted to cut through the bark of a log in at least one helical cut around the log in a manner permitting the bark to adhere to the log;

d. a second feed unit on said frame operative on the portion of the log having the helical cut;

e. a second hollow-rotor-type processing unit on said frame having tools adapted to remove the helically cut bark from the log as it is received from said second feed unit; and

f. a third feed unit on said frame operative on the debarked portion of the log.

3,991,801

PLASTIC FASTENERS WITH CONNECTING WEB

Steven Ausnit, 124 E. 61st St., New York, N.Y. 10021

Filed June 23, 1975, Ser. No. 589,373

Int. Cl.² A45C *13/10*; **B65D** *33/16*

U.S. Cl. 150—3 **11 Claims**

8. A bag construction comprising, in combination: a flexible plastic film bag body having side walls with upper free edges;

a first continuous strip of flexible plastic with an outer side of the strip forming an opening flange and an inner side of the strip forming a bag mounting flap;

a continuous releasable interlocking fastener profile integral with the strip on one surface thereof intermediate the sides;

a second continuous strip of flexible plastic material with an outer side of the strip forming an opening flange and the inner side of the strip forming a bag mounting flap;

a second continuous fastener profile of a size and shape to releasably interlock with the first profile, said profile being continuously integrally connected to said second strip intermediate its sides and located on one surface thereof corresponding with said one surface of the first strip;

and a continuous interconnecting film web of substantially uniform width extending between said strips and integrally connected at each outer edge surface respectively to the mounting flaps of said first and second strips at a location on the same surface as the profiles and between the profile and the free edge of each of the mounting flaps;

and said upper edges of said bag body being secured in face-to-face seam to said flap surfaces of said bag mounting flaps.

3,991,802

STUDDED TIRE

Yasushi Yokota, Kodaira, and Hisao Tsuji, Akigawa, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Oct. 24, 1974, Ser. No. 517,729

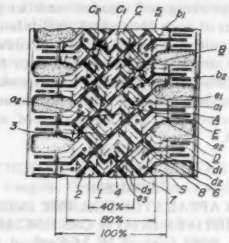
Claims priority, application Japan, Oct. 25, 1973, 48-119400

Int. Cl.² B60C *11/16*

U.S. Cl. 152—210 **2 Claims**

1. In a studded tire having a tread provided with a shoulder at each side, biased carcass plies and pin type spikes provided on the surface of said tread near to said shoulder, the improve-

ment comprising said spikes being struck in at least a first row in the range of 40 to 50% of the distance from the circumferential center of the tread to the shoulder, in at least a second



row in the range of 50 to 60% of said distance, and in at least a third row in the range of 60 to 80% of said distance, respectively.

3,991,803

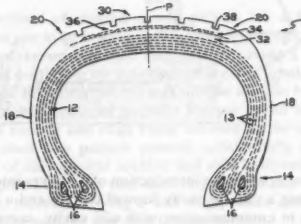
PNEUMATIC TIRE WITH REINFORCED TREAD

Jerome T. Praszek, Norton, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 11, 1974, Ser. No. 522,701

Int. Cl.² B60C *9/18*

U.S. Cl. 152—361 R **4 Claims**



1. In a method of forming the tread portion of a pneumatic tire which method includes applying to the circumference of the tire a radially inner, circumferentially disposed layer of essentially fabric-free elastomeric material, a radially intermediate, circumferentially disposed layer of fabric reinforced elastomeric material and a radially outer, circumferentially disposed layer of fabric-free elastomeric material, the improvement comprising applying said radially intermediate layer by continuously winding a single narrow strip of square-woven fabric in a predetermined number of successive circumferential turns such that the weft strands of said fabric are disposed substantially normal relative to the plane containing the circumferential centerline of said tire and a widthwise portion of said strip in each of a selected number of said turns overlaps a widthwise portion of said strip in an immediately preceding turn.

3,991,804

THERMAL PRESSURE RELIEF APPARATUS FOR TIRE AND RIM ASSEMBLY

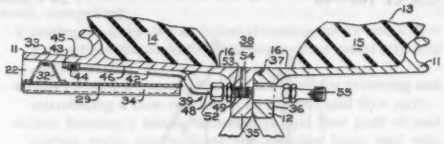
Martin E. Wilson, Troy, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 2, 1975, Ser. No. 573,939

Int. Cl.² B60C *29/00*; **F16K** *17/38*

U.S. Cl. 152—427 **9 Claims**

1. In a tire rim assembly in which said rim has a radially inner surface, a radially outer surface on which said tire is mounted and an air pressure chamber within said tire, the combination with said tire rim assembly of an air pressure relief tube in communication with said air pressure chamber, a length of said tube extending along said radially inner surface of said rim for exposure to rim temperatures along said length of said tube, a plug of eutectic material inserted in said



tube to a predetermined position along said length of said tube whereby said plug may be located where the temperatures generated during braking are the highest to maintain pressure in said air pressure chamber under normal temperatures and to melt said plug and release said air pressure at temperatures above the melting point of said eutectic material.

3,991,805

RETRACTABLE AWNING OF ADJUSTABLE ANGLE OF INCLINATION

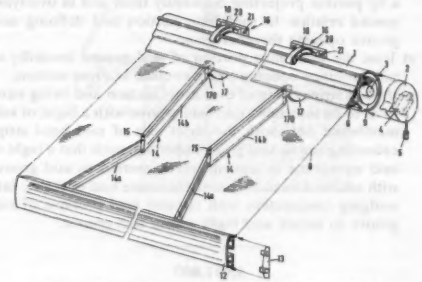
Manfred Clauss, Westerheim, Germany, assignor to Firma Clauss-Markisen, Ochsenwang, Germany

Filed Mar. 12, 1976, Ser. No. 666,250

Claims priority, application Germany, Apr. 5, 1975, 2514941

Int. Cl.² E04F *10/06*

U.S. Cl. 160—22 **11 Claims**



1. A retractable awning comprising:

a tubular awning housing having a longitudinal forward slot and closed off at the end by cap-like members;

an awning roll-up shaft rotatably mounted in said awning housing;

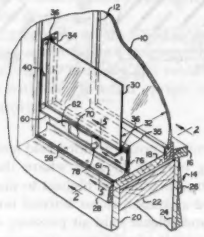
a bottom slat connected to extension arms such as are able to fold up against said housing in the retracted state of said awning, and

a plurality of adjustable holders (16) for holding said housing (16) each at least partly grasping around said housing (1) and each having mounting means on which an end of one of said extension arms is pivotally mounted, said adjustable holders each being mounted, rotatably about a horizontal axis common to all said adjustable holders, on a wall fixture, and having means for locking and unlocking said holder relative to said fixture with regard to rotation on said axis for adjusting the position of said housing about said axis.

3,991,806
STORM WINDOW CONSTRUCTION

Irwin R. Abell, Portland, Oreg., assignor to Temp-Rite, Inc., Portland, Oreg.

Filed Dec. 8, 1975, Ser. No. 638,551
Int. Cl.[2] A47H 13/00; E06B 3/32
U.S. Cl. 160—90 24 Claims



1. In a storm window construction in which a flexible, transparent membrane is stretched over a window opening on one side of a pane of window glass to trap an insulating layer of air between said pane and said membrane, a means for securing the edges of said membrane in tension to window framework surrounding said opening comprising:

framing strips adapted for attachment to all four sides of said framework in parallel spaced relation to said pane,

and bead strips cooperable with said framing strips for securing opposed edge portions of said membrane to said framing strips to place said membrane in tension,

each said framing strip including a longitudinal groove extending inwardly of said framing strip from a groove entrance opening along one side of said framing strip, said groove being bounded by a base portion of said strip and a lip portion projecting outwardly from and in overlying spaced relation to said base portion and defining said groove opening therebetween,

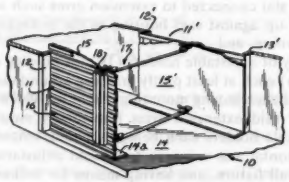
at least the innermost portion of said groove inwardly of said entrance opening being circular in cross section,

said bead strips being of oval cross section and being sized so as to be insertable into said groove with a bight of said membrane only with the short axis of said bead strips extending across said groove opening, such that a bight of said membrane in tension when inserted in said groove with said oval bead strip tends to rotate said oval strip into wedging cooperation with circular wall portions of said groove to secure said bight within said groove.

3,991,807
TEMPORARY DOOR INSTALLATION FOR GRAIN-CARRYING FREIGHT CAR

William E. Bruning, Omaha, Nebr., assignor to OMNI Railway Equipment Limited, Valley, Nebr.

Filed July 23, 1975, Ser. No. 598,172
Int. Cl.[2] E06B 5/00
U.S. Cl. 160—113 4 Claims

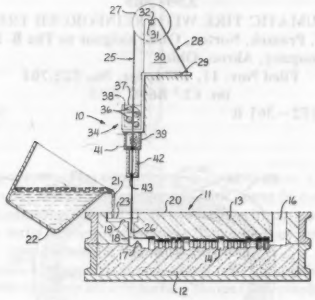


1. A temporary door installation for a grain-carrying freight car wherein the freight car has opposed doorways defined by vertical door posts and a floor, a temporary door panel extending across each doorway and being equipped with a plurality of vertically spaced-apart horizontally extending flat metal straps secured to said door posts, and a cross-tie assembly comprising an elongated wooden member positioned on the outside center of each door panel with its length extending vertically, said wooden member having its ends in alignment with two of said straps on its associated door panel, each of said two straps being equipped with a horizontally extending slot centrally disposed therein, and strap means connecting said wooden members at the ends thereof and extending through said slot.

3,991,808
METHOD AND APPARATUS FOR THE INTRODUCTION OF ADDITIVES INTO A CASTING MOLD

John R. Nieman, and Lawrence W. McFarland, both of Pekin, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 15, 1974, Ser. No. 488,758
Int. Cl.[2] B22D 27/20
U.S. Cl. 164—4 31 Claims



12. A method for the introduction of additives into a casting mold having a casting cavity formed therein and a controlled flow path in communication with said cavity, comprising the steps of:

directing a flow of molten metal through the controlled flow path into the casting cavity;

simultaneously feeding an endless wire of additive material into the flow path within the mold for erodibly mixing with the molten metal;

selectively varying the feed rate of the endless wire into said flow path for changing the properties of the molten metal and resulting casting;

preheating the wire prior to its entry into the flow path; and

automatically controlling the feed rate and preheating of said wire as a function of the temperature, chemistry and pouring rate of the molten metal.

31. An apparatus for the introduction of additives into a casting mold, comprising:

a casting mold providing an internal casting cavity, and a controlled plow path in communication with said casting cavity;

means for directing a flow of molten metal through said flow path into said casting cavity;

means for continuously feeding a substantially endless wire of additive material into said flow path for erodibly substantially completely mixing with said molten metal prior to its entry into said casting cavity, said feeding means including a wire feed mechanism having a drive roller and a variable speed drive motor powerably driving the drive motor for selective adjustment of the feed rate of the wire into said flow path;

means for selectively preheating said wire prior to its entrance into said flow path, said preheating means includ-

ing an induction heater disposed between said feed mechanism and said casting mold;

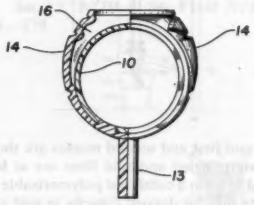
a guide member disposed between said feeding mechanism and said casting mold, said guide member having a passage formed therethrough for receiving and guiding the wire into said flow path; and

means operatively connected to the wire feed mechanism and the heater for controlling said wire feed mechanism and said heater as a function of the temperature, chemistry and pour rate of the molten metal.

3,991,809
METHOD OF MOLDING FINGER RINGS

Lawrence R. Voegele, Owatonna, Minn., assignor to Josten's, Inc., Owatonna, Minn.

Filed Mar. 10, 1975, Ser. No. 557,020
Int. Cl.² B22C 7/02, 9/04
U.S. Cl. 164—35 **14 Claims**



1. A method of making a wax pattern for a finger ring suitable for use in an investment method of casting comprising the steps of: securing a shell ring pattern having a hollowed-out interior portion to the exterior surface of a tubular section, each of said shell ring pattern and tubular section being composed of a wax material suitable for use in an investment method of casting and each being secured to the other such that said shell ring pattern extends substantially about the periphery of said tubular section and said hollowed-out portion is disposed between said shell ring pattern and said tubular section, thereby forming a wax ring pattern comprised of said shell ring pattern and said tubular section.

3,991,810
METHOD AND APPARATUS FOR INTRODUCING ADDITIVES INTO A CASTING MOLD

John R. Nieman, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 15, 1974, Ser. No. 488,756
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B22D 27/20
U.S. Cl. 164—57 **7 Claims**

1. A method of introducing additives into a casting mold having a casting cavity therein, including the steps of:

forming the casting mold with a down sprue, a mixing chamber, a runner connecting the down sprue with the mixing chamber, a choke at a level above the runner and of smaller cross section than the runner, a riser connected between the choke and the casting cavity, and an ingate disposed between the choke and the riser;

flowing molten metal into a pouring basin formed in the casting mold and connected to the down sprue;

directing the flow of molten metal from the pouring basin through the mixing chamber to the casting cavity;

positioning a wire feeder above the casting mold and in line with an open passage formed in the mold extending upwardly from the mixing chamber;

continuously feeding a substantially endless wire of additive material downwardly through the open passage and into the mixing chamber;

erodibly substantially completely mixing the wire of additive material into the molten metal flowing through the mixing chamber prior to its entry into the casting cavity; and

segregating impurities from the molten metal and collecting such impurities in the riser.

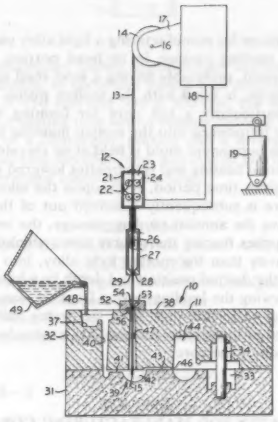
4. An apparatus for introducing additives into a casting mold, comprising;

a casting mold having an internal casting cavity and a flow path within the mold for directing molten metal into said casting cavity;

means forming a pouring basin in the mold for receiving and introducing a flow of molten metal into said flow path;

means forming a mixing chamber in said flow path of said casting mold intermediate the pouring basin and said casting cavity;

means forming an open ended passage in said casting mold in communication with said mixing chamber;



a wire feeder disposed externally of the mold for continuously feeding a substantially endless wire of additive material through said passage and into said mixing chamber so that said wire is erodibly substantially completely mixed with the molten metal flowing through said mixing chamber toward said casting cavity; and

said flow path including a down sprue in the mold extending downwardly from the pouring basin, a runner connecting the down sprue with the mixing chamber, a choke connecting the mixing chamber with said casting cavity and disposed at a level above the runner and having a smaller cross section than the runner to assure complete filling of the mixing chamber with molten metal prior to the molten metal flowing through the choke, a riser connected between the choke and the casting cavity, and an ingate disposed between the choke and riser with the ingate and riser promoting the segregation of impurities from the molten metal with such impurities being collected in the riser.

3,991,811

PROCESS FOR MANUFACTURING A LIGHT ALLOY PISTON HAVING AN ANNULAR COOLING PASSAGE IN ITS HEAD PORTION

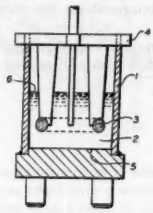
Adolf Diez, Bad Friedrichshall; Manfred Stark, Neckarsulm, and Kurt Anderko, Heilbronn, all of Germany, assignors to Karl Schmidt GmbH, Neckarsulm, Germany

Filed Jan. 15, 1975, Ser. No. 541,319

Claims priority, application Germany, Jan. 18, 1974, 2402337

Int. Cl.² B22C *21/14*; B22D *29/00*, *27/04*

U.S. Cl. 164—121 **4 Claims**



1. In a process for manufacturing a light alloy piston having an annular cooling passage in its head portion, wherein a permanent mold, preferably having a steel shell and a water-colored bottom, is filled with the molten piston alloy, core elements, particularly a salt core for forming the cooling passage, are introduced into the molten material by means of a holder, the permanent mold is held at an elevated temperature by external heating and is thereafter lowered into a water bath for a given time period, whereupon the alloy solidified, and the core is subsequently dissolved out of the solidified mass to leave the annular cooling passage, the improvement which comprises forcing the soluble core, which has a lower specific gravity than the molten light alloy, into the molten material to the desired position and depth by a holding device, and withdrawing the holding device from the remaining molten material while the mold is in the water bath when the solidification of the molten material has proceeded at least to the underside of the core.

3,991,812

APPARATUS FOR MANUFACTURING CORES AND MOLDS WITH PRESSURIZED STAGING HOPPERS

Joseph N. Kopp, Chicago, and Bruce V. Morris, McHenry, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Apr. 21, 1975, Ser. No. 569,826

Int. Cl.² B22C *15/24*, *13/12*, *7/06*

U.S. Cl. 164—200 **9 Claims**

1. Apparatus for forming from a first mass of particular matter coated with a catalyst-polymerizable resin film and a second mass of particular matter coated with a catalyst film for polymerizing said resin, a hardened core or mold, said apparatus comprising, in combination

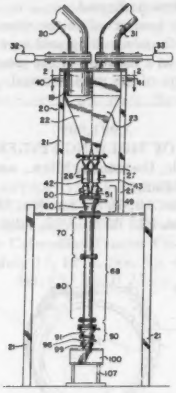
means including first and second staging hoppers for storing quantities of said first and second masses of particulate matter respectively, each of said staging hoppers including baffle means defining an internal pressurizing portion void of particulate matter;

means communicating with said interior portions for pressurizing said hoppers;

a core box having an interior void defining said desired core or mold;

continuous conduit means, includnig a conduit, for establishing a continuous, confined flow path for said particulate masses from said first and second staging hoppers to said core box, said conduit means including a mixing section comprising a static mixer for mixing said masses as they pass through said conduit; and

primary air injection means for establishing a continuous stream-like flow of said particles along said flow path



whereby said first and second masses are thoroughly and rapidly intermingled and said films are at least partially integrated to form a catalyzed polymerizable resin-coated particulate mix for deposit directly in said core box.

3,991,813

MELT CASTING APPARATUS

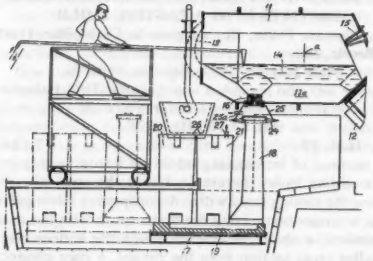
Conny Andersson, Viken; Kare Folgero; Bengt Fredriksson, both of Vasteras; Birger Hedberg, Hagfors; Steinar Steinarson, Hagfors, and Karl-Erik Oberg, Hagfors, all of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Continuation-in-part of Ser. No. 499,859, Aug. 22, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,456

Claims priority, application Sweden, Aug. 23, 1973, 7311465

Int. Cl.² B22D *27/00*, *37/00*

U.S. Cl. 164—259 **9 Claims**



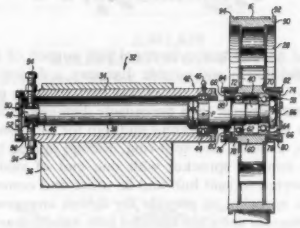
1. A metal-refining converter comprising an elongated vessel for containing a melt to be refined and which tilts so that it can be positioned upright or horizontal, said vessel having an upper end having a charging opening provided with a removable gas-tight cover and a lower end provided with a channel-type inductor and the vessel having a closable tapping hole in a side wall portion which is downward when the vessel is horizontal, said vessel having an internal contour permitting it when horizontal to hold said melt with a space above the melt, and said inductor having a channel positioned to receive

and heat the melt when the vessel is horizontal, said vessel having means for injecting pressurized-gas into said space when the vessel is horizontal, a casting apparatus for said converter and comprising a fountain having a bottom end and an open top and which is positioned so that its open top is registered by said vessel's tap hole when the vessel is tilted to its horizontal position, at least one mold having a bottom end communicating with the fountain's said bottom end, and means for separably intersealing the vessel's said wall portion and the fountain's said open top when the vessel is tilted to its horizontal position.

3,991,814
CASTING MACHINE WITH MULTI-BAND POSITIONING DEVICE

Yves Bernard Bonnamour, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed Sept. 10, 1975, Ser. No. 612,216
Int. Cl.² B22D *11/06*; F16H *7/18*
U.S. Cl. 164—278 **8 Claims**

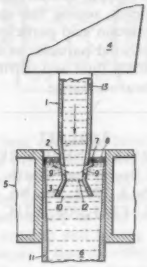


1. In a casting machine for continuously casting molten metal wherein a flexible endless band is guided into closed relationship with an arcuate portion of the peripheral groove of a rotatable casting wheel to form a casting mold and including means for positioning the band over the peripheral groove of the casting wheel, the improvement comprising said band positioning means including at least two band support wheels positioned adjacent said casting wheel for supporting said endless band, said band support wheels being rotatable about axes substantially parallel to the rotational axis of said casting wheel, axial motion means operatively connected to each of said band support wheels for independently moving each band support wheel along a line of motion substantially parallel to its axis of rotation, and pivotal motion means operatively connected to each of said band support wheels for independently pivoting the axis of rotation of each band support wheel about a point laterally displaced from each band support wheel, wherein said band positioning means includes shafts for said band support wheels, each of said band support wheels being rotatably mounted at one end of a respective shaft, each of said band support wheels further including a central bushing mounted to its respective shaft by means of a pair of bearings axially spaced at said one end of said respective shaft, and wherein said axial motion means includes sleeve means slidably received in the opposite ends of each of said bushings for urging the band support wheel associated therewith relative to its shaft.

3,991,815
CASTING TUBE WITH A BOTTOM OPENING FOR CONTINUOUSLY CASTING STEEL STRANDS

Thorwald Fastner, and Baldur Schramböck, both of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed June 20, 1975, Ser. No. 588,810
Claims priority, application Austria, June 25, 1974, 5235/74
Int. Cl.² B22D *11/10*
U.S. Cl. 164—281 R **5 Claims**

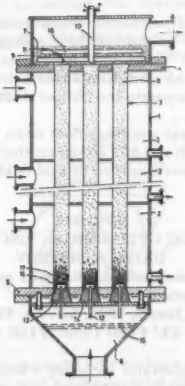


1. In a continuous casting apparatus for continuously casting steel strands, in particular billets with dimensions of between 300 × 150 mm and 500 × 300 mm, the improvement comprising a casting tube with a bottom opening, an end part composed of a converging portion and a diverging portion forming a necking therebetween, and at least two lateral outlet openings arranged above said necking.

3,991,816
METHOD OF EXCHANGING HEAT AND HEAT EXCHANGER

Dick Gerrit Klaren, Hillegom, Netherlands, assignor to Gustav Adolf Pieper, Heemstede, Netherlands

Filed Nov. 25, 1974, Ser. No. 527,036
Claims priority, application Netherlands, Nov. 30, 1973, 7316401
Int. Cl.² F28D *13/00*
U.S. Cl. 165—1 **16 Claims**



1. Heat exchanger for exchange of heat between a primary fluid and a secondary fluid, having at least one compartment

for the primary fluid through which pass a plurality of exchanger tubes arranged for upward flow of the secondary fluid, the tubes debouching at their upper ends into an outlet box and solid particles being provided which in operation of the heat exchanger provide a fluidised bed in each of the tubes, wherein said particles in operation of the heat exchanger also provide a layer in the outlet box, into which layer the upper ends of the tubes open, there being provided means for stirring said layer.

12. A method for exchanging heat between a moving primary fluid and a moving secondary fluid comprising passing a plurality of streams of secondary fluid upward through the moving primary fluid, each of said streams of secondary fluid containing solid particles, setting the speed of flow of said secondary fluid to maintain said particles as a fluidized bed, establishing a layer of solid particles at the upper termini of said streams of secondary fluid and stirring the solid particles in said layer during heat exchange.

3,991,817

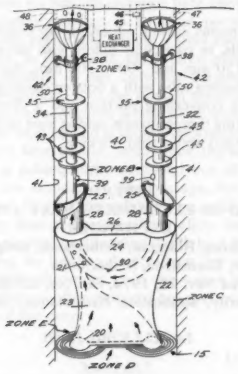
GEOTHERMAL ENERGY RECOVERY

Rufus G. Clay, 5500 Byers, Fort Worth, Tex. 76107

Filed July 2, 1974, Ser. No. 485,319

Int. Cl.² F24J *3/02*; **E21C** *21/00*

U.S. Cl. 165—1 **52 Claims**



1. A method of recovering resources from subterranean rock, particularly geothermal heat energy, comprising the steps of

a. drilling into the earth with a rockmelting drill,

b. forming two separate and distinct shafts at the same time with the drill,

c. circulating heat-absorbing fluid down one of said shafts to and through said drill and up another of said shafts, and

d. recovering heat absorbed by said fluid from said fluid.

3,991,818

REGENERATOR CYLINDRICAL VISCOUS DAMPER DRIVE ASSEMBLY

Douglas A. Wagner, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

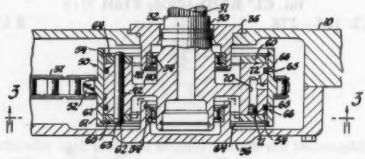
Filed June 9, 1975, Ser. No. 585,139

Int. Cl.² F28D *19/00*; **F16D** *3/52*

U.S. Cl. 165—8 **6 Claims**

1. A rotary regenerator including a housing, a drive shaft rotatably journalled in said housing, a matrix disk supported at one end on said drive shaft in driven engagement therewith for rotation within said housing, said drive shaft having at its opposite end an enlarged cylindrical hub portion of a predetermined axial length, a driven annular sprocket encircling said hub and journalled for rotation thereon relative to said hub, at least one split-ring, torsion spring mounted within said sprocket with one end of said spring connected to said hub and its other end connected to said sprocket to provide for driven engagement between said sprocket and said hub, axially spaced apart seal ring means operatively associated with the exterior peripheral surface of said hub and the inner peripheral surface of said sprocket to define therewith an annular cavity, a viscous fluid in said annular cavity in fluid engagement with the exterior peripheral surface of said hub and the inner annular surface of said sprocket and, axially spaced apart shoulder means associated with said sprocket in interference relation with respect to said hub to retain said sprocket against axial movement relative to said hub.

5. A rotary mechanism including a housing, a drive shaft rotatably journalled in said housing, a driven means supported at one end on said drive shaft in driven engagement therewith for rotation within said housing, said drive shaft having at its



opposite end an enlarged cylindrical hub portion of a predetermined axial length and outside diameter, a driven annular sprocket having an inner peripheral surface of a predetermined diameter greater than the outside diameter of said hub, said annular sprocket encircling said hub for rotation relative to said hub, at least one split-ring, torsion spring mounted within said annular sprocket with one end of said torsion spring connected to said hub and its other end connected to said annular sprocket to provide for driven engagement between said annular sprocket and said hub, axially spaced apart seal ring means operatively associated with the exterior peripheral surface of said hub and the inner peripheral surface of said annular sprocket to define therewith an annular cavity, a viscous fluid in said annular cavity in fluid engagement with the exterior peripheral surface of said hub and the inner peripheral surface of said annular sprocket and, axially spaced apart shoulder means associated with said annular sprocket in interference relation with respect to said hub to retain said sprocket against axial movement relative to said hub.

3,991,819

AIR CONDITIONING DEVICE

Ronald John Clark, Sidmouth, England, assignor to Sealed Motor Construction Co. Ltd., England

Filed Apr. 5, 1974, Ser. No. 458,458

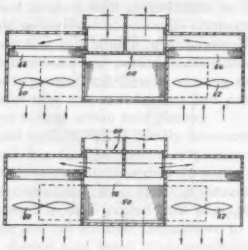
Claims priority, application United Kingdom, Apr. 11, 1973, 17513/73

Int. Cl.² F25B *29/00*

U.S. Cl. 165—29 **9 Claims**

4. A ventilating unit comprising a housing containing a reversible heat pump having an evaporator and a condenser, separate air passages for entraining air around the condenser and evaporator respectively between internal and external environments, separate reversible fans in the passages for moving the air independently in either direction through the passages, and control means providing at least two modes of operation, a first mode in which the fans act to move air between the two environments in one direction around the evaporator and in the opposite direction around the condenser, and a second mode in which the fans act to move air between the two environments in said one direction around the condenser and in said opposite direction around the evaporator, the fans being of similar construction and design, and

comprising a rotor in the form of a thin highly conductive disc located between two flat-face stators, each stator having one phase of a two-phase winding, and said stators being arranged so that the poles of one stator are intermediate those of the opposite stator, the fan vanes being carried directly by the



rotor disc, switch means for selectably connecting a phase shift capacitor for the windings with one or other of the windings for reversing the direction of rotation, the control means being further including means for providing at least two selectable fan speeds in the ventilating modes.

3,991,820

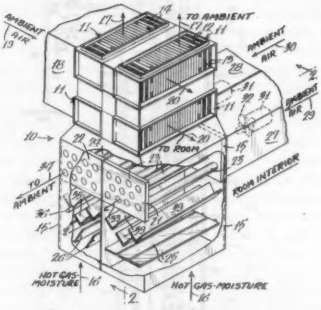
RECUPERATOR STRUCTURE

Homer D. Huggins, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.

Filed Dec. 18, 1975, Ser. No. 642,059

Int. Cl.² F28B *1/06*

U.S. Cl. 165—111 **9 Claims**



1. A recuperator structure for recovering heat values from a moisture laden hot gas stream, comprising: a plurality of heat exchangers having separated sets of passages therethrough in heat exchange relationship with each other, a first set of said passages having means for directing said gas stream therethrough and the second set of said passages having means for directing ambient air therethrough and to a space; means for precooling said moisture laden hot gas stream upstream of said heat exchangers to condense moisture from said hot gas stream; means for arranging said heat exchangers and corresponding precooling means in first and second separate banks each comprising a duct; flow control means in each said duct for directing said hot gas stream selectively through said separate ducts while maintaining said other said duct dormant; and means for directing a heating medium through the precool means in said dormant duct to melt any frost from said dormant duct precool means.

3,991,821

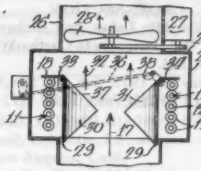
HEAT EXCHANGE SYSTEM

Neal A. Cook; Norman F. Costello, and Dennis C. Granetzke, all of Racine, Wis., assignors to Modine Manufacturing Company, Racine, Wis.

Filed Dec. 20, 1974, Ser. No. 534,873

Int. Cl.² F28F *27/00*

U.S. Cl. 165—103 **7 Claims**



1. A system for heat exchange between separate flowing fluids, comprising: a first conduit having spaced passages for flow therethrough of a first said fluid; a second conduit for a second fluid enclosing said first conduit; a flow directing first baffle extending transversely to said second conduit in the region of said first conduit and having a fluid flow opening adjacent to said passages; a flow diverting second baffle means within said opening having a flow diverting portion extending from the first baffle upstream of the direction of flow of said second fluid for diverting said second fluid laterally between said first conduit passages for heat exchange therewith; and a fluid directing third baffle on the side of said first conduit that is opposite to said first baffle and downstream of said first baffle, the flow thereby being directed by said baffles laterally through said passages that are upstream of the first baffle and then laterally inwardly through the passages that are downstream of the first baffle back into said second conduit, said passages comprising pipes in a plurality of successive sets with each set having a combination of a said first baffle and a said second baffle and a third baffle located between each successive pair of said combinations, each said second baffle comprising separable parts that are movable away from each other to provide substantially unrestricted flow of said second fluid through said second conduit and to block substantial flow of said second fluid between said pipes in the area of said second baffle.

3,991,822

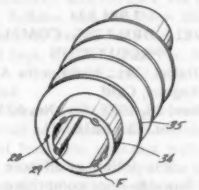
METAL TUBE HAVING INTERNAL PASSAGES THEREIN

Jack Morris, Fort Lauderdale, Fla., assignor to Olin Corporation, New Haven, Conn.

Division of Ser. No. 343,740, March 22, 1973, Pat. No. 3,831,246. This application Mar. 25, 1974, Ser. No. 454,090

Int. Cl.² F28D *7/10*

U.S. Cl. 165—140 **3 Claims**



1. A hollow annular metal tube having a continuous circumferential wall, said wall having an inner surface and an outer surface, said wall containing a continuous passage located between said inner surface and said outer surface, said passage having a length at least 30% greater than the length of said

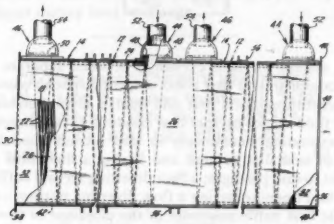
tube and said wall having a continuous fluid-tight weld seam along its length wherein said inner surface is substantially free from protrusion of said passage, and wherein said tube has a plurality of fins attached to said outer surface thereof.

3,991,823

MULTI-PASS HEAT EXCHANGER HAVING FINNED CONDUITS OF POLYGONAL CONFIGURATION IN CROSS-SECTION

William R. Litke, Franklin Lakes, and Richard J. Haberski, Emerson, both of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed May 29, 1975, Ser. No. 581,963
Int. Cl.² F28D 7/00; F28F 9/22
U.S. Cl. 165—145 **15 Claims**



1. A multi-pass heat exchanger comprising:
a. a shell having a first fluid inlet connected to a source of first fluid and an outlet opening connected to pass first fluid from the heat exchanger;
b. at least one tube bank connected to receive a second fluid from a source thereof and connected to pass said second fluid from the tube bank after passing in indirect heat transfer relationship with the first fluid;
c. said tube bank comprising at least one conduit of polygonal configuration in cross-section and having four contiguous surfaces;
d. the conduit being formed into a flattened helical configuration consisting of at least three substantially straight portions so arranged that alternate straight portions extend in substantial parallelism to each other and U-bend portions interconnecting next adjacent straight portions for series flow of a second fluid therethrough and to provide at least three passes in indirect heat exchange with said first fluid; and
e. said tube bank being disposed in said shell between said inlet and outlet openings so that the first fluid successively passess said straight portions of the conduit and to thereby effect heat transfer between said first and second fluids.

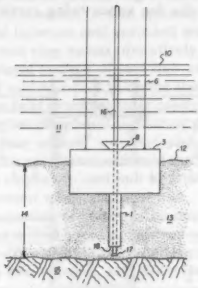
3,991,824

OFFSHORE WELL DRILLING, COMPLETION AND PRODUCTION

Frank J. Schuh, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Nov. 20, 1975, Ser. No. 633,581
Int. Cl.² E21B 7/12
U.S. Cl. 166—.5 **14 Claims**

1. Apparatus for use in drilling an offshore well in a body of water over a soft flowable floor comprising a chamber, said chamber being hollow and enclosed in a liquid-tight manner, said chamber carrying means for admitting liquid to its hollow interior to alter the buoyance thereof so said chamber can be made to float in said soft flowable floor and the pressure equalized between the inside and outside of said chamber as it floats in said floor, well conductor pipe means carried by and extending below said chamber, said well conductor pipe means not carrying any landing base below said chamber, said chamber having an opening to provide access for other well



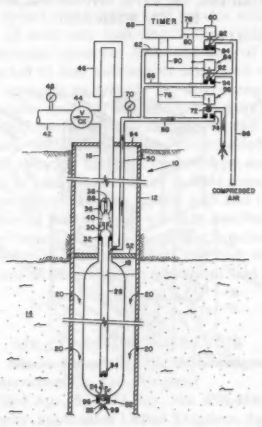
apparatus to pass from the top surface of said chamber through said opening and into said well conductor.

3,991,825

SECONDARY RECOVERY SYSTEM UTILIZING FREE PLUNGER AIR LIFT SYSTEM

Thomas H. Morgan, 800 NW. Loop 410, 528 GPM Life N. Tower, San Antonio, Tex. 78216

Filed Feb. 4, 1976, Ser. No. 655,253
Int. Cl.² F04F 1/06; E31B 33/03; E21B 43/00
U.S. Cl. 166—68 **7 Claims**



1. A system of secondary recovery of oil from a petroleum well, said system including:
production tubing extending from a wellhead to an oil producing zone of said well;
accumulator means located in said oil producing zone of said well, said accumulator means being attached to a lowermost end of said production tubing;
standing valve in the bottom of said accumulator means to allow flow therethrough only into said accumulator;
transfer tube extending from said production tubing to near the bottom of said accumulator;
piston means having a limited flow passage therethrough, said piston means slidably located in said production tubing between said transfer tube and said wellhead;
flow line means connected to said production tubing at said wellhead for receiving oil from said production tubing;

pressure/exhaust line extending from said wellhead to said accumulator;

control means connected to the wellhead end of said pressure/exhaust line, said control means having a timer means for periodically energizing at least three surface valves;

a first of said surface valves first connecting said pressure/exhaust line to atmosphere for a first predetermined time period to allow said accumulator to fill with oil;

a second said surface valves secondly connecting said pressure/exhaust line to a source of pressurized gas for a second predetermined time period to allow said accumulator to be slowly pressurized thereby moving said oil through said transfer tube and said limited flow passage into said production tubing above said piston;

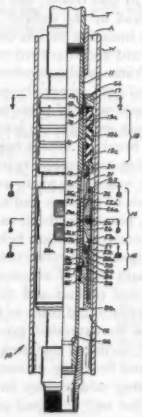
a third of said surface valves thirdly connecting said pressure/exhaust line to said source of pressurized gas for a third predetermined time period for rapid pressurization of said accumulator, said rapid pressurization causing limiting valves in said limited flow passage to close and said piston and oil located thereabove to move to said wellhead during said third predetermined time period, afterwards said pressure/exhaust line being reconnected to atmosphere which allows said limiting valves to open and said piston means to fall back to its lowermost position to repeat the cycle.

3,991,826

RETRIEVABLE WELL PACKER AND ANCHOR WITH LATCH RELEASE

John Lindley Baugh, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Feb. 5, 1975, Ser. No. 547,223
Int. Cl.² E21B *23/06*
U.S. Cl. 166—120 **8 Claims**



1. A well device adapted to be releasably set internally of a well conduit comprising:

a. a mandrel;

b. radially movable means carried by said mandrel for engagement between said well device and the internal surface of said well conduit, said radially movable means being radially movable between a radially extended position in touching engagement with said internal surface and a radially retracted position in which said well device may be moved longitudinally through said well conduit;

c. setting means associated with said radially movable means for moving said radially movable means from said retracted position to said extended position;

d. locking means included in said well device for selectively retaining said radially movable means in said extended position; and

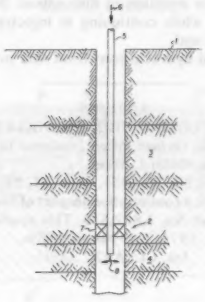
e. coengaging thread-constituting, frangible releasing means operatively connected with said locking means and frangible by longitudinal movement, or disengageable by simultaneous rotational and longitudinal movement, of said mandrel relative to said radially movable means to allow release of said locking means for permitting said radially movable means to move to said retracted position whereby said well device may be moved longitudinally through said well conduit.

3,991,827

WELL CONSOLIDATION METHOD

Michael D. Schall, Lafayette, La., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 22, 1975, Ser. No. 642,892
Int. Cl.² E21B *33/138, 47/10*
U.S. Cl. 166—253 **3 Claims**



1. In a consolidation method in a well having at least two separate zones which are to be subjected to the consolidation treatment, the improvement comprising incorporating in each zone which is subjected to said consolidation treatment a tracer material which has a color that is unique to that particular zone so that said colored tracer material is visually identifiable at the earth's surface, said tracer material being such that it will at least in part be produced back to the earth's surface if the consolidation treatment is not adequate, and analyzing at the earth's surface fluid thereafter produced from said well to determine if any and if so which zone is still leaking solid particles into said well.

3,991,828

THERMAL RECOVERY METHOD

Joseph C. Allen, Bellaire, and Yick-Mow Shum, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 23, 1974, Ser. No. 508,378
Int. Cl.² E21B *43/24*
U.S. Cl. 166—261 **1 Claim**

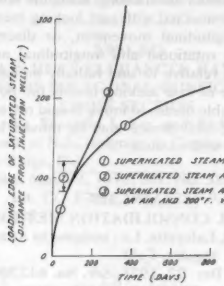
1. A method for recovering hydrocarbons such as low gravity viscous crude oil or bitumen from a subterranean reservoir penetrated by at least one injection well and at least one production well comprising the steps of:

a. injecting via said injection well super heated steam into the formation,

b. terminating injection of said super heated steam and initiating injection of air to establish an in situ combustion front in said reservoir,

c. continuing injection of said air to support the in situ combustion front and resuming injection of super heated steam into said injection well,

d. terminating injection of said super heated steam and initiating injection of water along with the air to continue an in situ combustion front,



THERMAL ADVANCE - TIME RELATIONS

e. terminating air injection to discontinue the in situ combustion front while continuing to inject water into said injection well and

f. producing said hydrocarbons from said production well.

3,991,829

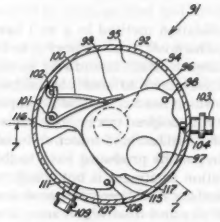
DELAYED CLOSING FIRE SPRINKLER HEADS

Wilfred V. Johnson, Oxford, Mass., assignor to U.S. Fire Control Corporation, Oxford, Mass.

Division of Ser. No. 399,851, Sept. 24, 1973, Pat. No. 3,911,940, which is a continuation-in-part of Ser. No. 143,394, May 14, 1971, Pat. No. 3,802,510. This application Oct. 14, 1975, Ser. No. 621,859

Int. Cl.[2] A62C *37/06*

U.S. Cl. 169—19 **6 Claims**



1. A valve assembly for use in automatic fire extinguishing systems and comprising:

a housing means defining inlet and outlet openings;

a valve member movable between closed and open positions, said valve member preventing fluid flow between said inlet and outlet openings when in said closed position and permitting the discharge of fluid available at said inlet opening through said outlet opening when in said open position;

actuator means for moving said valve member between said open and closed positions;

primary temperature responsive control means operatively coupled to said actuator means for automatically effecting movement of said valve member to said open position in response to ambient temperatures above a given level; and

auxiliary temperature responsive control means operatively coupled to said actuator means and operative to automatically effect movement of said valve member to said closed position in response to an ambient temperature below said given level occurring subsequently to opening of said valve member by said primary control means.

3,991,830

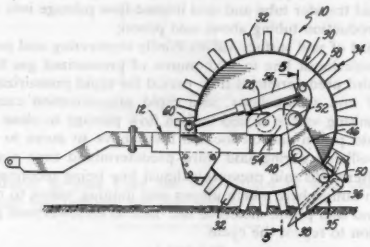
LAND CLEARING DEBRIS PULVERIZER

Willard W. Shepherd, Whittier, Calif., assignor to Shepherd Machinery Co., Los Angeles, Calif.

Filed Feb. 3, 1975, Ser. No. 546,384

Int. Cl.[2] A01B *49/02, 35/18, 77/00*

U.S. Cl. 172—180 **1 Claim**



1. In an apparatus for pulverizing debris in land clearing operations, or the like, the combination of:

a. a frame;

b. a ground engaging rotor extending transversely across said frame and mounted thereon for rotation about a transverse axis of rotation and carrying generally radial, ground engaging teeth arranged in transversely spaced, circumferential rows;

c. debris pickup and breaking means carried by said frame for feeding debris to said rotor teeth in response to forward movement of said frame, and cooperating with said rotor teeth to break up the debris;

d. said pickup and breaking means comprising pickup fingers having forward and rearward ends and spaced apart laterally of said frame, and comprising breaker bars at the rearward ends of and generally perpendicular to said pickup fingers, said rows of rotor teeth passing between said pickup fingers and breaker bars;

e. said pickup and breaking means being pivotally mounted on said frame for movement relative thereto about a transverse pivot axis, said pivot axis being offset rearwardly of said axis of rotation and said pickup and breaking means being pivotable about said pivot axis between an extended, operative position below and rearwardly of said axis of rotation and a retracted, inoperative position rearwardly of said axis of rotation and above ground level, whereby said pickup and breaking means moves rearwardly away from said rotor as it pivots upwardly and rearwardly from its extended position to its retracted position so as to facilitate dumping of any debris caught in said pickup and breaking means; and

f. means for pivoting said pickup and breaking means between its extended and retracted positions.

3,991,831

COMBINATION POST-PLOWING CULTIVATING IMPLEMENT AND FIELD DRAG

Phillip W. Foster, Rochelle, Ill., assignor to Lee Blacksmith, Inc., Rochelle, Ill.

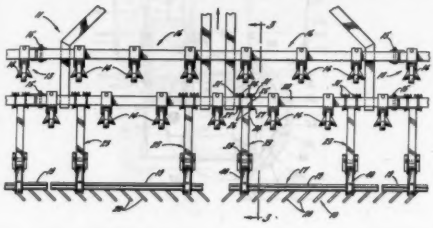
Filed Apr. 7, 1975, Ser. No. 565,861

Int. Cl.[2] A01B *49/02, 31/00*

U.S. Cl. 172—198 **1 Claim**

1. In combination, a post-plowing cultivating implement including a frame with a plurality of spaced rows of soil-working parts connected thereto for engagement with the ground, and a field drag attached to said frame and extending rearwardly behind the rearmost row of said parts, said drag includ-

ing a support beam with one end attached to said frame and projecting rearwardly therefrom, an arm pivotally connected to and depending from the other end of said beam for movement toward and away from said implement, said arm being selectively adjustable in length away from said beam, an elongted mounting bar section connected to the lower end of said arm and extending laterally therefrom generally in a horizontal direction parallel with said rearmost row of said soil-working parts, a series of spaced teeth secured to said bar section along the lower edge thereof, substantially all of said teeth extending generally parallel with each other in a direction slanted downwardly from and generally toward one end



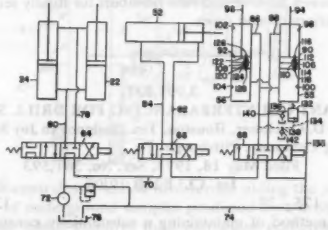
of said section at an acute included angle with respect to the lower edge of said section, at least two of said teeth being connected to said mounting bar section for approximately each linear foot thereof and the length of each of said teeth being such that the lower end of each of said teeth is disposed generally vertically below the upper end of the next adjacent one of said teeth toward said one end of said section, a spring connected between said arm and said frame and urging said arm toward said frame so as to urge said teeth toward the ground to embed in and work the soil behind said implement, and means for adjusting the force with which said spring urges said arm toward the implement.

3,991,832

HYDRAULICALLY TILTABLE AND ANGLABLE DOZER BLADE AND MOUNTING THEREFOR

Phillip Clinton Cooper, Holy Cross, Iowa, assignor to Deere & Company, Moline, Ill.

Filed July 14, 1975, Ser. No. 595,272
Int. Cl.² E02F *3/76, 3/85*
U.S. Cl. 172—804 **3 Claims**



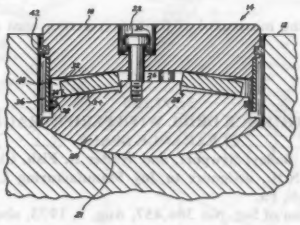
1. In a combination including first and second two-day hydraulic angling actuators connected between a dozer blade and a frame to which the blade is connected by universal connection means located between the actuators and by stabilizing connection means for guiding the blade during angling and tilting movements of the latter about the universal connection means, a two-way hydraulic tilting actuator connected between the blade and frame, a first conduit means connected between a first direction control valve and a head-end work port of the first actuator and a rod-end work port of the second actuator, a second conduit means connected between the control valve and a rod-end work port of the first actuator and a head-end work port of the second actuator, third and fourth conduit means respectively connected between a second control valve and head and rod-end work ports of the tilting actuator, each of a source of fluid pressure and a reservoir connected to the first and second control valves, the improvement comprising: a pilot pressure conduit means and a reservoir connected pressure relief conduit means respectively connected to one and another of said first and second conduit means; a normally closed, pressure responsive relief valve means located in said pressure relief conduit means and connected to said pilot pressure conduit means and responsive to a predetermined pressure in the latter to assume an open condition whereby pressure induced in said angling actuators by actuation of said tilting actuator will be kept at a value no greater than said predetermined pressure by operation of said bypass valve means.

3,991,833

PILE HAMMER CUSHION APPARATUS

Robert W. Ruppert, 242 Globe Ave., Union, N.J. 07083

Filed Nov. 20, 1974, Ser. No. 525,479
Int. Cl.² E02D *7/06*
U.S. Cl. 173—20 **24 Claims**



1. A pile hammer cushion apparatus comprising (1) first and second anvil elements each characterized by an axis of impact, said elements being connected coaxially in a manner limiting movement of them away from each other, and (2) at least one flat spring located between said anvil elements tending normally to bias those elements into extended, spaced-apart relationship and being so disposed and configured to deflect resiliently and permit said anvil elements to be moved toward each other under external impact.

3,991,834

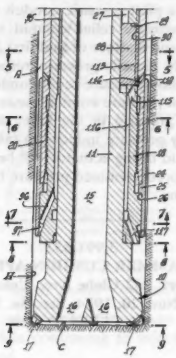
SAMPLING AIRHAMMER APPARATUS

Alfred R. Curington, Rte. 1, Brookgreen Drive, Inman, S.C. 29349

Filed July 7, 1975, Ser. No. 593,738
Int. Cl.² E21B *5/00*
U.S. Cl. 173—73 **21 Claims**

1. Apparatus for obtaining formation samples from the bottom of a bore hole: an outer housing structure having means thereon for securing said structure to a tubular drill string; bit means connected to said housing structure for producing formation cuttings to drill the bore hole to a desired diameter; said bit means having a sample passage therethrough for receiving the formation cuttings and for conducting such cuttings upwardly toward the tubular drill string; means for discharging fluid into the bore hole in the region of the bit means to convey the formation cuttings into said sample passage; seal means on the lower portion of said housing structure above the lower end of said bit means and having a diameter substantially corresponding to the diameter of the bore hole; and means for directing fluid from the interior of said housing structure into the bore hole externally of said housing structure adjacent and simultaneously to the upper

and lower ends of said seal means to provide a zone of substantially static fluid around said seal means creating a fluid



barrier to the movement of formation cutting past said seal means.

3,991,835

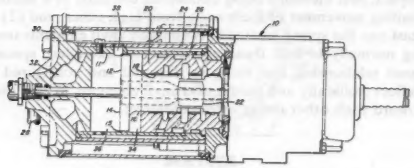
PNEUMATIC ROCK DRILL WITH PERIPHERAL PISTON CLEARANCE SPACE

Edward A. Bailey, Newport, and Walter D. Fish, Claremont, both of N.H., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Continuation of Ser. No. 386,457, Aug. 7, 1973, abandoned. This application Dec. 11, 1974, Ser. No. 531,564

Int. Cl.² E21C *3/24*

U.S. Cl. 173—134 **5 Claims**



1. A pneumatic rock drill assembly comprising: a rock drill body member adapted to carry a striking bar; a bore within said body member; a stepped piston member coaxially received and reciprocable within said bore and adapted to impact on such a striking bar; said piston member including a stem portion received within a reduced diameter portion of said bore and a head portion received within a larger diameter portion of said bore; said head portion having the exterior axial extent thereof of a diameter smaller than the diameter of said larger diameter portion to define a continuous open peripheral space between said head portion and said larger diameter portion of said bore; said stem portion being closely slidably received within said reduced diameter portion to maintain said peripheral space throughout the reciprocation of said piston member; and passageway means in at least one of said members operable to direct pneumatic pressure fluid alternately to said opposed faces to reciprocate said piston member.

3,991,836

WELL BORE PERFORATING APPARATUS

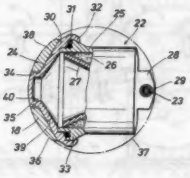
Gerard Bouguyon, Plaisir, and Pierre Chesnel, Savigny-sur-Orge, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 610,960

Claims priority, application France, Sept. 20, 1974, 74.31759

Int. Cl.² E21B *43/117*

U.S. Cl. 175—4.6 **4 Claims**



1. Perforating apparatus adapted for passage through well piping and including:

an elongated carrier strip with an arcuately-shaped transverse cross section of substantially-uniform thickness formed of a tough ductile steel and having a plurality of internally-threaded laterally-drected charge-mounting openings spatially disposed along the longitudinal axis of said carrier strip; and

perforating means on said carrier strip and including a detonating cord, a plurality of encapsulated shaped explosive charges respectively enclosed in a two-part hollow case having a front case member carrying a threaded axial projection sized for cooperative engagement within said charge-mounting openings, a rear case member telescopically interfitted with said front case member and angularly positionable in relation thereto, means for cooperatively retaining said detonating cord on each of said hollow cases including a transverse cord-receiving opening arranged on each of said rear case members respectively and adapted for being aligned with one another upon rotation of said rear case members to a common angular orientation, and sealing means cooperatively arranged between each of said case members for fluidly sealing the interiors of said cases.

3,991,837

BUOYANT COUNTERBALANCING FOR DRILL STRING

Charles D. Crickmer, Houston, Tex., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

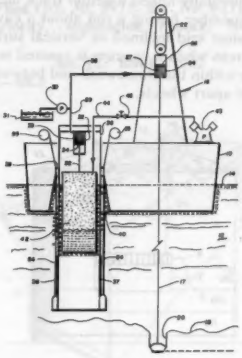
Filed May 18, 1973, Ser. No. 361,593

Int. Cl.² E21B *19/08*

U.S. Cl. 175—27 **13 Claims**

1. A method of maintaining a substantially constant positioning of a string of members suspended from a vessel floating on a body of water comprising the steps of; isolating a limited portion of said body of water within a downwardly extending elongated conduit carried by such a vessel in a manner that the upper level of said limited portion of said body of water remains at a substantially constant height above the bottom of said body of water regardless of substantially all wave action in said body of water, supporting float means in the upper reach of said limited portion at a substantially constant height with respect to said upper level of said limited portion of said body of water, applying flotation force from

said float means to pressure fluid means supported by said vessel whereby said last mentioned means supports such a



string of members suspended therefrom at substantially constant upper end height avove such a bottom.

3,991,838
DRILL SAMPLING DIVERSION UNIT

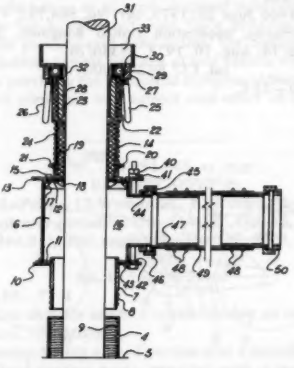
Barry Frederick Clark, 7 Bligh Crescent, Seaforth, Sydney, New South Wales, 2092, Australia

Filed June 2, 1975, Ser. No. 582,981

Claims priority, application Australia, May 31, 1974, 7743/74

Int. Cl.² E21B *49/02*

U.S. Cl. 175—210 **9 Claims**



1. A self-centralizing sealed diverter for aiding the surface collection of underground samples produced by a drilling rig of the kind which employs fluid extraction comprising, in combination,

a. a first rigid casing driven into the ground to line a partially drilled hole,

b. a rigid chamber mounted above and firmly but removably attached to said first casing via sealing means and adapted to receive and retain drill samples,

c. a sleeve fastened to the top of said chamber and having therein a stuffing box having an at least partly self-lubricating stuffing gland which lines said box, said sleeve being movable laterally with respect to said rigid chamber,

d. journalling means removably mounted upon the top of said sleeve for journalling at least one drill rod entering said sleeve from above the jounalling means, and also for axially locating initially said stuffing gland which lines said box,

e. a second casing including at least one bearing for aligning the drill rod with respect to a drill head,

f. a protective top-plate attached to said second casing of said bearing, and

g. a pressed-in bush coupled to said bearing to be interposed between the rod and said bearing, said bush permitting little play between said bearing and the rod and being composed of material harder than the material of the rod.

3,991,839
PROJECTION SCALE WITH PRICE INDICATOR

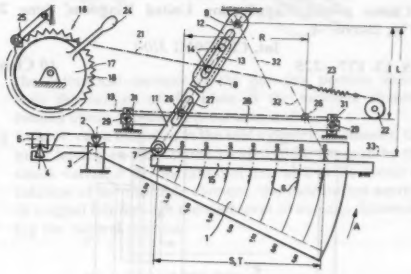
Josef Schwarz, Balingen, Wurttemberg, Germany, assignor to Bizerba-Werke Wilhelm Kraut K.G., Germany

Filed Oct. 29, 1975, Ser. No. 626,710

Claims priority, application Germany, Oct. 31, 1974, 2451820

Int. Cl.² G01G *23/34*

U.S. Cl. 177—40 **15 Claims**



1. In a price indicating projection weighing scale for weighing merchandise and comprising a housing, a plurality of price scales each relating to a given base price mounted on a support member movable relative to said housing as a function of weight and an optical projection system with an objective movable and indexable relative to an appropriate price scale corresponding to a given base price for projection of a portion of the price graduation, the improvement comprising movable support means for said objective, control means for indexing said support means in accordance with the base price of the merchandise to be weighed, and transmission means between said control means and said support means, said transmission means having an adjustable transmission ratio.

3,991,840
WEIGHING DEVICES

John Rawcliffe, Manchester, England, assignor to The University of Manchester Institute of Science & Technology, Manchester, England

Filed July 14, 1975, Ser. No. 595,636

Claims priority, application United Kingdom, July 12, 1974, 31051/74

Int. Cl.² G01G *3/08, 7/00*

U.S. Cl. 177—210 **7 Claims**

1. A top loading weigh balance, comprising:

a. a platform,

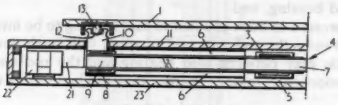
b. a plurality of resilient suspension devices supporting the platform,

c. a plurality of transducers individually associated with the suspension devices, each transducer comprising a movable and a fixed inductance coil arranged so that move-

ment of the platform and the suspension device varies the mutual inductance of the coils,

d. an oscillator having a resonant circuit associated therewith, and

e. means connecting the coils of all of the transducers in series with each other in the resonant circuit,



f. the transducers being arranged to vary the output frequency of the oscillator in accordance with the overall change in displacement of the suspension devices, and hence the load.

3,991,841

WEIGHING DEVICE

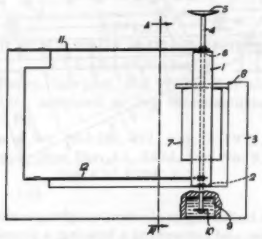
David F. C. Crawley, Keyworth, England, assignor to The Boots Company Limited, Nottingham, England

Filed June 18, 1975, Ser. No. 587,916

Claims priority, application United Kingdom, June 25, 1974, 28090/74

Int. Cl.² G01G *3/00*

U.S. Cl. 177—225 **10 Claims**



1. A weighing device which comprises a frame, a ring formed from a band of thin flexible material, the plane of the ring being vertical, the nadir of the ring being supported on said frame, and the acme of the ring being free to move downwardly as the ring is compressed by the application of a downwardly directed force and upwardly when the force is dissipated; a receptacle for the object to be weighed; said receptacle being connected to the acme of the ring, whereby a force applied to the receptacle, as by the deposit of the object to be weighed in said receptacle, causes compression of the ring; at least one cantilever substantially perpendicular to the plane of the ring, one end of which is fixed to said frame and the other end of which is connected to the acme of the ring in a manner to impede sideways flexing of the ring, the cantilever's length and moment of inertia being such that it has substantially no effect on the flexure of the system; and means for measuring the amount of compression of the ring.

3,991,842

MOVABLE VACUUM SECURED APPARATUS FOR INCLINED OR VERTICAL SURFACES

Lyle Vernon Larsen, Naperville, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed July 25, 1975, Ser. No. 599,160

Int. Cl.² B62D *63/02*

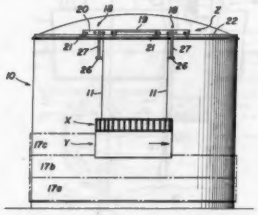
U.S. Cl. 180—1 VS **19 Claims**

1. Apparatus to be movably and releasably secured to an inclined or vertical surface comprising:

a rigid framework having two pairs of axially mounted vertically spaced-apart horizontal wheels horizontally spaced-apart on a framework;

an endless track mounted on the wheels and comprising a plurality of pivotally-linked together track members, with each track member having a rim about a cavity adapted to press against said inclined or vertical surface and be secured thereto when a vacuum is created in the cavity;

an open space within the framework and between the vertically spaced-apart wheels;



a flexible vacuum conduit operatively extending from the cavity of each track member into the framework open space and to a vacuum valving means for selectively creating and maintaining a vacuum between the track member and the inclined or vertical surface when in contact therewith; and

means operatively associated with the wheels to drive the wheels to thereby effect crawling of the track as it is held by vacuum on the inclined or vertical surface.

3,991,843

CYCLES

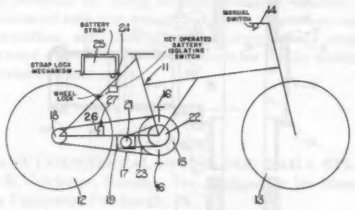
Charles Patrick Duncan Davidson, Droitwich, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed June 20, 1975, Ser. No. 588,782

Claims priority, application United Kingdom, June 28, 1974, 28776/74; Aug. 10, 1974, 35350/74

Int. Cl.² B62M *7/00*

U.S. Cl. 180—33 C **7 Claims**

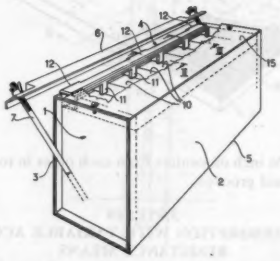


1. A cycle including a frame, a ground engaging wheel rotatably mounted on the frame, a rotatable drive member rotatably mounted on the frame and arranged to be rotated by the rider of the cycle, an endless, non-extensible, flexible member coupling said wheel and said drive member whereby rotation of said drive member rotates said wheel to propel the cycle, an electric motor and an associated power source carried by said frame, means transmitting rotational movement of the output of the motor to said drive member whereby said motor can propel the cycle, and electrical switch means in use controlling energisation of said motor, said electrical switch means being operable by said endless member when said endless member is subject to tension as a result of rotation of said drive member in a direction to propel the cycle.

3,991,844
DEVICE AND METHOD FOR HOLDING A STORAGE BATTERY

Jacques Reynier, Eymet, France, assignor to Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed Oct. 30, 1975, Ser. No. 627,364
Claims priority, application France, Nov. 25, 1974, 74.38590
Int. Cl.² B60R 18/02
U.S. Cl. 180—68.5 8 Claims



4. In combination with a vehicle having a pair of fixed walls at right angles defining a vehicle ridge, and a battery comprising individual cells, a container for said cells having a pair of walls at right angles defining a container ridge, one of which container walls constitutes its bottom and is adapted to rest on one of said vehicle walls with the other of said container walls adjacent the other of said vehicle walls, that improvement comprising means to exert a tightening force on the cells which is transmitted from the cells via said container to one said walls of said vehicle as a vertical force component, said means comprising a part located adjacent a side of said container diagonally opposite said vehicle and container ridges, projecting members depending from said part and resting on upper surfaces of at least some of said cells, and means including an angle bar so as to apply diagonal tightening force via said angle bar to said part, said force providing a vertical component pressing said cells against the container bottom and said bottom against said one of said vehicle walls and said force also providing the horizontal component biasing the said last-named container wall against said other of said vehicle walls.

3,991,845
REMOTE SHIFT

Roger F. LaPointe, 13 Wyman St., Worcester, Mass. 01610

Continuation-in-part of Ser. No. 514,293, Oct. 15, 1974, Pat. No. 3,944,013. This application Dec. 22, 1975, Ser. No. 643,078
Int. Cl.² B60K 26/02
U.S. Cl. 180—77 R 6 Claims

1. Remote shift for use in a vehicle having an engine and a transmission, comprising

a. a housing having a fixed portion and a movable portion, the fixed portion being provided with a large bore in which is rotatably carried a cylindrical element of the movable portion and a smaller bore extending coaxial of and extending from the bottom of the large bore,

b. a shift handle pivotally mounted about a first axis on the movable portion of the housing,

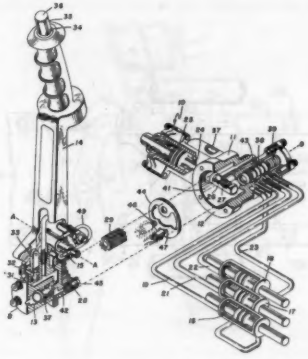
c. a plurality of hydraulic motors located at the transmission,

d. a pressure hydraulic line connecting each motor to the housing,

e. a return hydraulic line connecting all of the motors to the housing,

the movable portion of the housing being mounted on the fixed portion of the housing for rotation about a second axis extending at a right angle to the axis of pivotal rotation of the handle, the rotation of the handle about the first axis and the rotation of the handle and the movable portion of the housing causing pressure to appear in the pressure hydraulic lines to operate the hydraulic motors,

f. a plate extending across the bottom of the large bore in the fixed portion of the housing, the radial end surface of



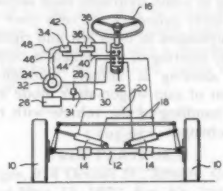
the cylindrical element of the movable portion sliding over the surface of the plate as the movable element rotates about the said second axis, and

g. a check valve mounted in the said cylindrical element, the plate having an indentation located to be engaged by the check valve for the operation of the valve at the center of rotation of the movable element, the indentation serving as a signal felt through the shift lever to assist in determining the neutral position.

3,991,846
POWER STEERING SYSTEM

Willard L. Chichester, and Howard C. Hansen, both of Battle Creek, Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Aug. 7, 1975, Ser. No. 602,847
Int. Cl.² B62D 5/06
U.S. Cl. 180—132 12 Claims



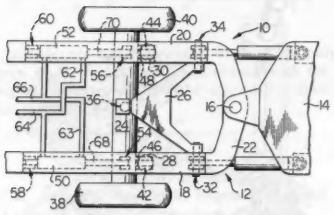
1. In a hydraulic steering system for vehicles having an operator control means, dirigible wheel means, hydraulic motor means for actuating the wheel means to steer the vehicle and hydraulic pump means for actuating the motor means to steer the vehicle means responsive to the control means which generates a signal which is a function of the operator's demand for rate of change and total change in the steering angle, and an electric motor and motor control means responsive to said signal for driving said pump means intermittently in response to and as a function of the operator demand for rate of change and total change in the steering angle.

3,991,847

STEERING SYSTEM FOR AN ARTICULATED VEHICLE

Dale H. Unruh, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 14, 1975, Ser. No. 604,570
Int. Cl.² B62D 5/06
U.S. Cl. 180—135 4 Claims



1. A steering system for an articulated vehicle having an axle mounted thereon in wagon-steer mode, comprising:

a pair of articulated steer cylinders operatively mounted on said vehicle for articulated steering movement of the vehicle;

a pair of wagon-steer cylinders operatively mounted on said vehicle for steering movement of said axle mounted in wagon-steer mode for about 3° left and right movement;

a source of pressurized hydraulic fluid flow for actuation of said steering cylinders;

a pilot valve and a manually controlled steering member for moving the pilot valve selectively in left and right steering control;

a steering control valve for controlling hydraulic flow to and from said steering cylinders, hydraulic connection means providing for movement of the control valve responsive to movements of said pilot valve;

hydraulic flow connections from said source through said steering control valve to said cylinders, said control valve being ported to admit hydraulic fluid sequentially first to said wagon-steer cylinders and only then to said articulated steer cylinders in both left and right steering control, whereby steering of the vehicle in both left and right directional steering is initially through wagon-steer movemement of said wagon-steer mode axle facilitating high speed handling of the vehicle with relatively small directional changes.

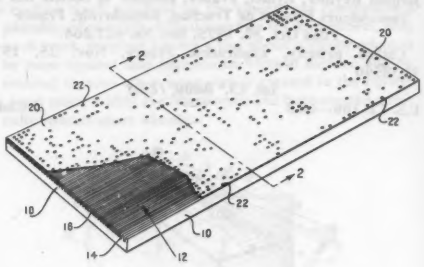
3,991,848

ACOUSTICAL BOARD

George G. Davis, Cos Cob, Conn., assignor to Frigitemp, New York, N.Y.

Filed Aug. 16, 1974, Ser. No. 497,952
Int. Cl.² E04B 1/99
U.S. Cl. 181—33 G 2 Claims

1. An acoustical facing material comprising a melamine board having a thickness between 1 and 2 inches, including a plurality of longitudinal ribs between 3/16 and ⅜ inch high on one side thereof, having grooves 3/16 inch wide between each pair of ribs, said grooves being ½ inch apart, and a fabric covering of glass fiber material impregnated with a stiffening agent covering the ribbed side of said board, said fabric material having holes intermediate said ribs 3/16 inch in diameter



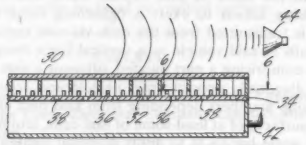
and spaced ½ inch on centers from each other in rows directly above the said grooves.

3,991,849

SOUND ABSORPTION WITH VARIABLE ACOUSTIC RESISTANCE MEANS

Gary Warner Green, Enfield, and Ernest Feder, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 481,004, June 19, 1974, abandoned. This application July 21, 1975, Ser. No. 597,630
Int. Cl.² E04B 1/99
U.S. Cl. 181—33 H 3 Claims



1. A method for varying the acoustic resistance of a nonlinear acoustical lining having a porous facing sheet and a substantially close-ended, side and bottom enclosure member defining a cavity having a plurality of cells, said lining being disposed in a duct of an air propulsor subject to changing sound level and grazing airflow conditions comprising:

connecting said liner to air passage means for communicating said cells therewith and forcing air through said cells; and

forcing selected different amounts of air through said cells for different sound level and grazing airflow conditions in the duct to change the acoustic resistance of said liner to an acoustic resistance which is optimum therefor.

3,991,850

NOISE-ATTENUATING POSITIONERS FOR ACOUSTIC WELL-LOGGING TOOLS

Pierre C. Escaron, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,555
Int. Cl.² G01V 1/40; E21B 17/10
U.S. Cl. 181—102 16 Claims

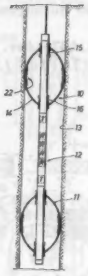
1. Acoustic well-logging apparatus comprising:

a tool body adapted for movement through a well bore;

acoustic transducer means cooperatively arranged on said tool body and adapted for directing energy at a selected acoustic frequency between spaced locations on a well bore wall; and

positioning means cooperatively arranged on said tool body for maintaining said tool body in a selected lateral position in relation to a well bore wall and including at least one positioning member having one portion thereof cou-

pled to said tool body and another portion thereof laterally spaced from said tool body and having an outwardly-facing wall-engaging surface adapted for sliding engagement along a well bore wall, and noise-dampening means comprising a composite material bonded to at least the inwardly-facing surface of said other portion of said positioning member and substantially consisting of an elastomer containing a substantial number of interspersed particles of a sound-dampening material for reducing the level of noise at said selected acoustic frequency transmitted into a well bore upon sliding movement of said outwardly-facing wall-engaging surface along a well bore wall.

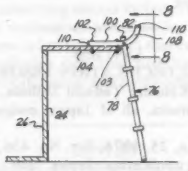


3,991,851

SAFETY LADDER FOR ABOVE-THE-GROUND SWIMMING POOLS

Peter F. Gannon, Troy, Mich., assignor to Vinyl-Fab Industries, Ferndale, Mich.

Division of Ser. No. 388,393, Aug. 15, 1973, Pat. No. 3,908,795. This application Apr. 16, 1975, Ser. No. 568,586
Int. Cl.² E06C *9/08*
U.S. Cl. 182—86 **3 Claims**



1. A safety ladder for a swimming pool having a deck supported at an elevated position above the ground, said safety ladder comprising:

support means elevated above the ground comprising a pair of spaced and substantially parallel J-shaped support members secured to the top surface of said deck at an edge thereof,

a pivotal detachable ladder section having two substantially parallel and elongated spaced side support members with a plurality of steps fastened intermediate of said side support members, and

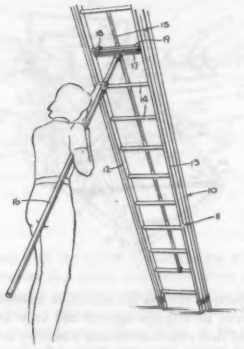
connecting means for pivotally and detachably attaching said ladder section to said support means.

3,991,852

LADDER AIDS

Malcolm J. Brookes, 30 E. 68th St., New York, N.Y. 10021; James Sheridan, Box 295-A Rte. 1, Englishtown, N.J. 07726, and Douglas M. Spranger, 23 Fiske Place, Brooklyn, N.Y. 11215

Filed Feb. 7, 1975, Ser. No. 547,801
Int. Cl.² E06C *1/397, 1/20*
U.S. Cl. 182—169 **4 Claims**



1. A retractable lifter to facilitate the raising and lowering of a ladder by a user who lacks sufficient strength to directly handle the ladder, said ladder having rod-like rungs extending between a pair of rails, said lifter comprising:

A. a long pole to provide an arm extension to the user of the lifter;

B. a transverse piece, one side of which is attached at its midpoint to the upper end of the pole, said piece having a length substantially equal to the space between said rails, and

C. a pair of clips mounted on the opposite ends of the piece and extending slightly beyond said ends, whereby the outer faces of said clips are positioned directly adjacent said rails, each clip being formed of a resilient plastic block having flat outer faces and being cut to define a pair of spring jaws projecting forwardly with respect to the upper end of the pole and forming the banks of a circular cavity, said jaws being forced apart when applied to a rung engaged by the clips to admit the rung into said cavity which is dimensioned to freely accommodate same, whereby the clips may be rotated about the rung and the pole held at any desired angle relative to the ladder plane, said piece having a channel formation and said clip blocks being received within the channel and being secured thereto.

3,991,853

TREE PLATFORM

Bobby L. Bridges, 924 Oconee St., Athens, Ga. 30601

Filed Mar. 15, 1973, Ser. No. 341,364
Int. Cl.² A47C *9/10*
U.S. Cl. 182—187 **2 Claims**

1. A tree climbing and support platform device comprising, in combination:

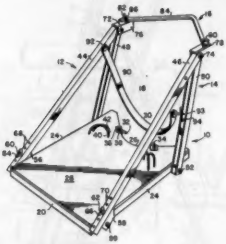
a platform member having a generally veed rear edge adapted to rest against one side of a tree trunk;

a pair of stabilizing framework secured to opposite side of said platform and extending upwardly and rearwardly thereof to straddle the tree trunk, each stabilizing framework comprising a first strut pivotally secured at its lower end to said platform member adjacent the forward edge thereof and inclining upwardly and rearwardly therefrom, and a second strut pivotally secured at its opposite ends

to said platform member adjacent the rear edge thereof and to said first strut adjacent the upper end thereof;

a first reaction means for selective securement at its opposite ends adjacent the upper ends of said stabilizing framework to engage the tree trunk above said platform member on that side opposite to said one side against which said platform member rests;

foot-anchoring means on said platform member for anchoring a user's feet thereto whereby to allow such user to climb the tree with the aid of said platform device;



auxiliary reaction means for selective connection between said frameworks to engage against the tree trunk in spaced relation to said first reaction means whereby to allow the user to climb past a limb projecting from the tree trunk, said first reaction means comprising a generally V-shaped bar and said auxiliary reaction means comprising a length of flexible material, said flexible material being positioned below said V-shaped bar; and

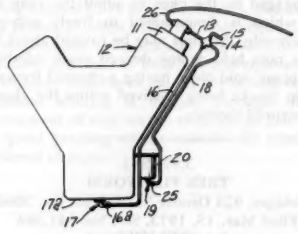
said device further including a pair of anchor members pivotally secured about horizontal axes respectively to the upper ends of said first struts, said first reaction means being selectively secured to said anchor members.

3,991,854

AUTOMOBILE ELECTRIC VACUUM PUMP FILTERING SYSTEM

Howard C. Tilley, 7220 N.W. Coronado, Kansas City, Mo. 64152

Filed May 9, 1974, Ser. No. 468,231
Int. Cl.² F16M *13/02*
U.S. Cl. 184—1.5 **2 Claims**



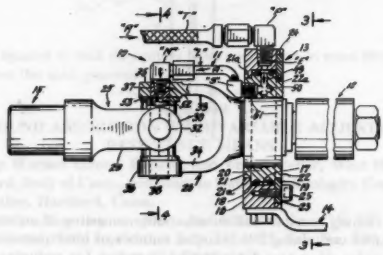
1. In combination, an oil drainage system and an internal combustion engine having an oil pan and an external oil filter including a wall, said pan and filter normally containing lubricating oil, said combination comprising: a vacuum pump mounted on said engine and having an input and an output, a three-way valve arrangement having an exit and alternate inputs, said valve exit being connected to said pump input, a first fitting communicating into said oil pan, a first line connected between said oil pan fitting and one of said valve arrangement inputs, a second fitting communicating into said filter through said filter wall, a second line connected between said second fitting and the other of said valve arrangement inputs, a discharge line connected to said pump output, and means alternately selecting one of said alternate inputs in said valve arrangement for communicating with said exit whereby oil is removable from said oil pan and said filter through said discharge line.

3,991,855

AUTOMATIC GREASER FOR UNIVERSAL JOINT

Leo A. Heintzelman, 4990 Burlingame Ave., Wyoming, Kent County, Mich. 49509

Filed Jan. 20, 1975, Ser. No. 542,495
Int. Cl.² F16N *13/22*
U.S. Cl. 184—12 **3 Claims**



1. In a device of the class described to deliver lubricant grease to a flexible clutch having a drive and a driven shaft, comprising, in combination, a reservoir to which lubricant is delivered and from which the lubricant is sent to the clutch, said reservoir having a circular space with a circular disk member snuggly fitting therein, the outer diameter of said disk being smaller than the diameter of said space in said reservoir, the difference between said diameters forming a clear room into which lubricant may collect to be fed to said clutch; one side of said disk being held to said flexible clutch with its drive shaft, with the other side being held to the driven shaft, said clutch being formed of two forked U-shaped members held to one another by means of stud shafts, and means for supplying lubricant grease to said stud shafts to prevent friction, said means delivering said lubricant from said stationary reservoir to said clutch being driven by said drive shaft to drive the driven shaft aforesaid.

3,991,856

ELEVATOR CABLE OSCILLATION-ABSORBING DEVICE

Masayuki Shigeta, Katsuta; Tadashi Shibata, Naka, and Toshihiko Nara, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 25, 1974, Ser. No. 436,724
Claims priority, application Japan, Jan. 29, 1973, 48-11054
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² B66B *7/06*
U.S. Cl. 187—1 R **12 Claims**

1. Apparatus comprising:

a first load member,

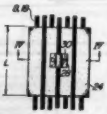
a second load member spaced from said first member,

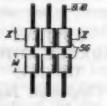
a plurality of flexible line members extending in side by side relationship to one another from said first load member to said second load member with one end of each of said line members being attached to said first load member and the other opposite end of each of said line members being attached to said second load member,

moving means for moving said line members together with said first and second load members,

and oscillation-absorbing means for absorbing lateral oscillations of said line members, said absorbing means being connected to a first of said line members for movement both laterally and longitudinally with said first line member, said absorbing means being resiliently engageable with a second of said line members while permitting relatively free longitudinal movement of said second line member with respect to said absorbing means and said first line member, whereby absorption of lateral oscillations in said first and second line members by said absorbing means is obtained while permitting free relative longitudinal movement of said first and second line members to accommodate for different rates of longitudinal expansion and the like,

wherein said absorbing means includes a relatively flat sheet of resilient material disposed to have a plurality of said line members in lateral contact therewith at both opposite sides thereof with only said first line member attached thereto for both lateral and longitudinal movement therewith.





3,991,857

ELEVATABLE PLATFORM FOR LOAD TRANSFER

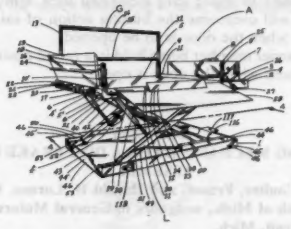
Charles J. Wolk, Weingarten, and Milton Osterman, St. Louis County, both of Mo., assignors to Charles J. Wolk, Weingarten, Mo.

Filed Mar. 24, 1975, Ser. No. 561,667

Int. Cl.² B66F *3/22*; B66B *11/04*

U.S. Cl. 187—18 **11 Claims**

1. A materials handling device comprising an upper load-receiving plate, a lower base plate in planar parallel relationship to said upper plate, a pair of first and second lever units spaced apart transversely of said device and interengaging said upper and lower plates for movement of the upper plate toward and away from said lower plate, each of said first and second lever units comprising an outer arm and an inner arm, thereby being a transverse sleeve-forming member connecting the inner arms of said lever units substantially intermediate their length, each inner arm having a bearing opening in registration with said sleeve-forming member, a main shaft progressing through said sleeve-forming member and being journalled within said bearing openings in said inner arms and with the outer portions of said main shaft extending beyond the inner arms and interconnectingly engaging said outer arms substantially intermediate their length, said inner and outer arms of each lever unit being pivotally engaged at one of their ends to one of said plates and at their opposite ends being slidably engaged with the other of said plates, a fluid cylinder interposed between the outer and inner arms of each lever unit, means pivotally engaging each fluid cylinder at one end to said upper plate, a piston engaged within each cylinder for movement toward and away from same at its opposite end, and means operatively connecting said piston in its cylinder-remote portion with said main shaft, and first and second cam means operatively connecting each piston with the outer and inner arms, respectively, of the related lever unit.



3,991,858

LOCKING DEVICE FOR A DOOR

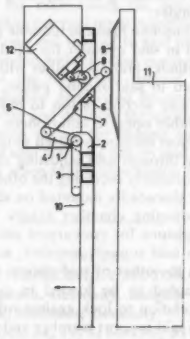
Tage Westerlund, Skelleftea, Sweden, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed Apr. 9, 1974, Ser. No. 459,436

Claims priority, application Sweden, Apr. 26, 1973, 7305872

Int. Cl.² B66B *13/20*

U.S. Cl. 187—61 **7 Claims**



1. A locking device for an elevator door, said locking device comprising in combination:

a. a barrier member mounted adjacent the upper edge of a door and in a direction transverse to the movement direction of the door, said barrier member resting against the door in the closed position of the door and adapted to be raised by the door above the upper edge of the door when the door is opened,

b. an elongated lock arm,

c. an arrangement of levers for operatively connecting said barrier member with said elongated lock arm, said ar-

rangement of levers including an elongated axle member, a first lever member connecting said axle member to one end of said lock arm and a second lever member connecting said axle to said barrier member,

d. stop means associated with one portion of said lock arm,

e. a stationary shoulder,

f. resilient means which normally biases said stop means against said shoulder, and

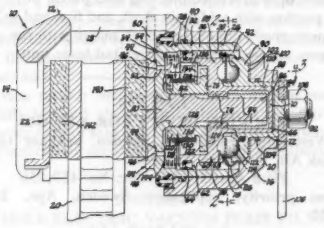
g. guide means for said lock arm, said guide means being positioned to guide said elongated lock arm in a path which will overcome the biasing action of said resilient means when the door is to be opened,

h. said barrier member being held in a raised position by the door itself when the door is open.

3,991,859
ADJUSTING MECHANISM FOR A DISC BRAKE CALIPER ASSEMBLY

James L. Coulter, Fraser, and Harald H. Lorenz, Bloomfield Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1976, Ser. No. 662,220
Int. Cl.² F16D 65/56
U.S. Cl. 188—71.9 **2 Claims**



1. In a disc brake actuating and adjusting mechanism:

an actuating cylinder;

first and second cup-like brake actuatable pistons telescopically mounted in said cylinder for axial movement relative to said cylinder and each other with said first piston sealingly nested in said second piston, said first piston opening into said second piston to define therewith an adjusting chamber open to atmosphere;

an adjusting support member secured to one of said pistons and extending through said adjusting chamber and slidably and non-rotatably receiving the other of said pistons;

an adjusting nut threadedly mounted on said support member in said adjusting chamber axially intermediate the ends of said pistons for concurrent rotational and axial movement on said support member, said nut being engageable with the other of said pistons and during brake actuation adapted to be loaded in compressive force transmitting relation to lock against rotational and axial movement on said support member and to transmit brake actuating forces between said pistons through said support member

torsional force means connecting said nut and one of said pistons and urging said nut to move axially on said support member in an axial direction tending to move said pistons in axially divergent directions when such relative piston movement is permitted;

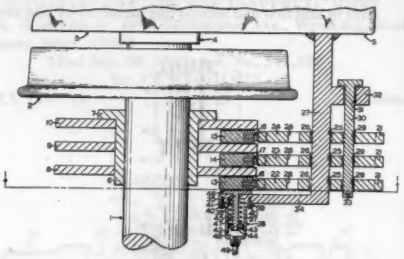
means limiting movement relative to said cylinder of one of said pistons in a brake releasing direction by said torsional force means;

and means preventing rotational movement of said pistons relative to said cylinder.

3,991,860
MEANS ENABLING REPLACEMENT OF WORN DISC BRAKE SHOES WITHOUT DISASSEMBLY

Quentin T. Clemmons, Chula Vista, Calif., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Apr. 24, 1975, Ser. No. 571,389
Int. Cl.² F16D 69/04
U.S. Cl. 188—73.6 **17 Claims**



11. The method of replacing a worn braking element detachable from one end of a releasable locked arm member rotatable about a fulcrum means when unlocked, comprising the steps of:

a. first, removably attaching a new braking element to the other end of said arm member,

b. next, effecting the unlocking of said releasable locked arm member,

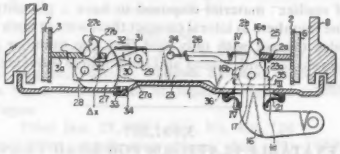
c. thereafter, rotating said unlocked brake element-carrying arm member about said fulcrum means through an angle of substantially one hundred and eighty degrees to move said new braking element to the position formerly occupied by said worn braking element, and

d. then effecting the relocking of said arm member.

3,991,861
BRAKE SHOE CLEARANCE AUTOMATIC ADJUSTING DEVICE

Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Japan

Filed July 11, 1975, Ser. No. 595,311
Claims priority, application Japan, July 17, 1974, 49-81865
Int. Cl.² F16D 65/54
U.S. Cl. 188—79.5 P **5 Claims**

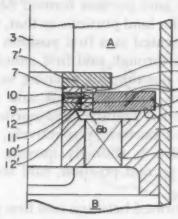


1. An automatic brake shoe clearance adjusting device for use in a shoe drum brake having a back plate and a pair of arcuate brake shoes for frictionally engaging with inner surface of a rotatable drum, and comprising a strut of adjustable length movably mounted between the brake shoes, one end of which operatively engages with one of the brake shoes with a predetermined clearance in the brake applying direction, a lever pivoted on the other end of said strut and which engages with the other one of the shoes, said lever being adapted to be actuated by manual brake actuating means, a spring connected to said strut for urging the strut toward said the other brake shoe, and a stop on said strut for abutting the lever for limiting the rotation of said lever on said strut in the direction of the non-actuated position of said lever to determine a non-actuated position of the lever relative to the strut.

3,991,862
DAMPING FORCE GENERATING DEVICE IN SHOCK ABSORBER

Hisao Tanabe, Yokohama, Japan, assignor to Tokico Ltd., Japan

Filed June 24, 1975, Ser. No. 589,839
Claims priority, application Japan, June 28, 1974, 49-74163
Int. Cl.² F16F 9/348
U.S. Cl. 188—282 6 Claims



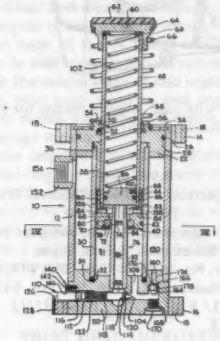
1. A damping force generating device for a shock absorber having an oil space partitioning member disposed in a pressure chamber containing oil therein for dividing the pressure chamber into two oil spaces, said oil space partitioning member having an opening therein for placing the two oil spaces in communication and an annular resilient valve member operatively associated with said oil space partitioning member for controlling oil flow through the opening, said device comprising a first annular disc having a plurality of cut-outs in the outer circumferential portion thereof, and a second annular disc having a plurality of cut-outs in the outer circumferential portion thereof and being disposed in overlapping relationship with the first disc, said second disc normally engaging the inner circumference of the annular valve member for guiding the movement thereof, the outer circumferential portion of said first disc abutting the inner circumferential portion of the valve member and acting as a valve seat therefor, and said cut-outs in the first and second discs together forming a fixed orifice having a predetermined aperture area, irrespective of the relative angular positions of the disc for placing the two oil spaces permanently in communication with each other.

3,991,863
METERING SHOCK ABSORBER WITH MANUAL ADJUSTMENT

Patrick P. Lee, Tonawanda, N.Y., assignor to Integrated Dynamics Incorporated, Buffalo, N.Y.

Continuation of Ser. No. 372,837, June 22, 1973, abandoned.
This application Jan. 3, 1975, Ser. No. 538,399
Int. Cl.² F16F 9/48
U.S. Cl. 188—289 15 Claims

1. A shock absorber comprising: a cylinder having a chamber containing hydraulic fluid; a piston mounted in said cylinder for reciprocating movement in said chamber relative thereto, said piston having an axial bore therethrough and means defining an annular recess in said bore; a fixed metering pin projecting through said axial bore of said piston; a valve element captively retained in said recess of said piston about said metering pin and defining therewith a primary orifice structure for controlling the flow of fluid from one side of said piston to the other side thereof, said valve element being retained in said recess in a manner permitting limited free axial and lateral movement relative thereto for self-centering orientation about said metering pin and said metering pin being provided with a tapered portion projecting through said valve element for varying the opening of said primary orifice upon movement of said piston in said chamber; an auxiliary orifice structure defining an opening for augmenting fluid flow from the region of said chamber on said side of said piston to the region of said chamber on said other side of said piston; said metering pin having an axial bore therethrough to provide an internal passage communicating at the opposite ends thereof with said auxiliary orifice opening and the other side of said piston, respectively; adjustable means mounted in said shock absorber for movement in said opening upon external application of a mechanical force input to said adjustable means for varying the size of said opening of said auxiliary orifice structure by a predetermined amount in proportion to said external input to control the relative softness or relative stiffness of the shock absorbing action, said adjustable means



including means for maintaining the adjusted size of said opening until another external input is applied; a hollow piston rod connected at one end thereof to said piston and movable between fully extended and retracted positions and adapted to receive a load at the other end thereof, a second piston mounted in said hollow piston rod for reciprocating movement relative thereto and defining therewith an accumulating reservoir, and spring means for biasing said second piston against said end of said metering pin on said other side of said first-named piston when said hollow piston rod is in said fully extended position.

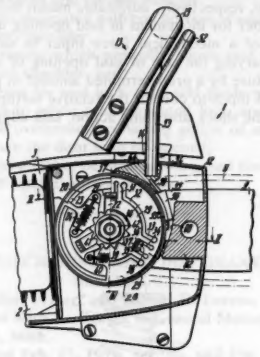
3,991,864
MOTOR SAW, ESPECIALLY MOTOR CHAIN SAW

Erich Müller, Hegnach, Germany, assignor to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Filed Oct. 24, 1974, Ser. No. 517,800
Claims priority, application Germany, Oct. 25, 1973, 2353479
Int. Cl.² F16D 23/10; B23D 57/02
U.S. Cl. 192—105 BA 30 Claims

1. In a motor driven chain saw having a chain drive socket adapted for being driven by the output shaft of the saw motor, a clutch having one element connected to the motor shaft and another element for driving the sprocket, said clutch elements being normally in driving engagement, and a follower member forming a part of one of said clutch elements and moveable in the axial direction of the motor shaft during engaging and disengaging of the said clutch elements, said follower member

having internal means for positive connection thereon and the other clutch element having external means for positive connection engageable with said internal means for positive connection when the clutch is engaged.

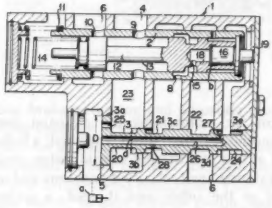


3,991,865

DEVICE FOR GRADUALLY INCREASING HYDRAULIC PRESSURE

Mitsuaki Komatsu, Kawasaki, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Continuation of Ser. No. 446,826, Feb. 28, 1974, abandoned.
This application Jan. 2, 1976, Ser. No. 645,932
Int. Cl.[2] F16D *25/12*; F16K *31/12*
U.S. Cl. 192—109 F **14 Claims**



1. A device for gradually increasing hydraulic pressure in a hydraulic fluid supply control circuit of a transmission in which a plurality of clutch means, each having a hyraulically operated cylinder-piston assembly, and a source of hydraulic pressure, said device including an inlet connected to said source of hydraulic pressure; an outlet connected to said cylinder-piston assembly; a first passage formed therethrough for permitting said inlet and outlet to communicate with each other; means for gradually increasing hydraulic pressure having a pressure chamber and slidably provided within a box of the device by the side of said inlet while intersecting said first passage; a second passage formed therewithin for permitting said first passage and the pressure chamber of said means to communicate with each other; a back pressure chamber formed therewithin at the back of said means; a third passage formed therewithin for permitting said second passage, said back pressure chamber and a drain to communicate with one another; and a quick return valve slidably provided with the device by the side of said outlet while intersecting said first, second and third passages for controlling said means so that hydraulic fluid in said first passage is supplied through said second passage to said pressure chamber of said means to control the gradual increase of hydraulic pressure in said first passage, said quick return valve having first, second, third and fourth annular land portions formed, in turn, on its outer periphery along its longitudinal axis; first, second and third annular recess portions formed between the respective land portions; and a cavity formed therein along its longitudinal axis, one end of said cavity being opened to said first passage and the other opposite end thereof being formed with an orifice so as to permit said cavity and said back pressure chamber to communicate therethrough with each other, the improvement characterized in that said quick return valve comprises:

a. another annular land portion formed between said first and second annular land portions so that, when said quick return valve is located at a first position for shutting off said first passage through said first annular land portion and at a second position for opening said first passage, said quick return valve shuts off said second passage through said another annular land portion and said second annular land portion, respectively, and while said quick return valve is slidingly moving from said first position to said second position, said second passage is opened,

b. another orifice formed between said first passage and said second passage so as to permit said first passage and said second passage to communicate with each other when said quick return valve is located at said first position, and

c. a hole formed in said means for permitting said second passage and said pressure chamber of said means to immediately communicate with each other,

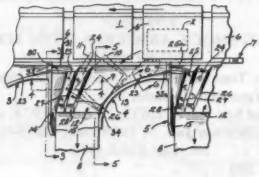
whereby the responsibility of said means to gradually increase hydraulic pressure in said first passage is improved at the time when the gradual increasae of hydraulic pressure is started without producing peak pressure immediately before the start of the gradual increase of hydraulic pressure, thereby providing fast shifting of said transmission.

3,991,866

DISCHARGE CHUTE STRUCTURE

Gary J. Wirth, Milwaukee, Wis., assignor to Speaker Motion Systems, Inc., Milwaukee, Wis.

Filed Nov. 6, 1974, Ser. No. 521,336
Int. Cl.[2] B65G *11/00*
U.S. Cl. 193—2 R **23 Claims**



20. A parcel turning discharge chute means for receiving a load from a conveying means having means to move the load sideways from a moving support travelling from an upstream to a downstream path of the conveying means, said apparatus comprising a base wall and interconnected upstream wall and a downstream wall, said base wall having mounting means to locate the base wall in an inclined plane arrangement with an upper mounting edge adapted to be located adjacent a longitudinal run of a conveying means and a laterally spaced bottom run-out edge, said upstream wall being secured to the base wall in downwardly spaced relation to said upper edge and extending from the upstream edge downstream and outwardly of the mounting edge as a continuous curved wall member to define a close-spaced stabilizing wall portion adjacent the conveying means with a generally continuous guide wall to the run-out edge of the chute, and said upstream wall extending essentially normal to the base wall and having a short upstream entrance portion extending upwardly and

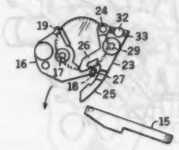
outwardly from the base wall to form an inclined lead-in portion to said normal portion.

3,991,867

COIN TESTING AND SEPARATING APPARATUS

Bart G. Martin, St. Louis, Mo., assignor to Coin Acceptors, Inc., St. Louis, Mo.

Filed June 13, 1975, Ser. No. 586,998
Int. Cl.² G07F 3/02
U.S. Cl. 194—102 **7 Claims**



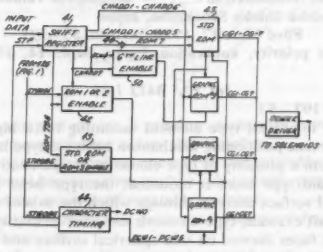
1. In coin testing and separating apparatus:
a. a frame having means thereon defining coin acceptance and coin rejection passageways,
b. a coin cradle pivotally mounted on said frame for conveying a coin to said acceptance passageway,
c. a latch lever pivotally mounted on said frame adjacent said cradle, and
d. said latch lever having a first detent means engageable with said cradle to limit cradle movement and prevent the cradle from conveying coins to said acceptance passageway, and a second detent means with a shoulder disposed for contact with the edge of a coin lodged in the cradle, the shoulder of said second detent means making slidable contact with a smooth edged coin of acceptable size in the cradle to displace said first detent means to a non-engaging position with respect to said cradle, and making retaining engagement with a milled edge coin of acceptable size in the cradle to hold the lever and position the first detent means to engage the cradle.

3,991,868

METHOD AND APPARATUS FOR PRINTING SEGMENTED CHARACTERS

Prentice I. Robinson, Pelham, and Paul A. Lavoie, Manchester, both of N.H., assignors to Centronics Data Computer Corporation, Hudson, N.H.

Filed Mar. 11, 1975, Ser. No. 557,276
Int. Cl.² B41J 3/04
U.S. Cl. 197—1 R **13 Claims**



1. Printing apparatus of the dot matrix type for forming graphic patterns of variable height comprising:
a paper document;

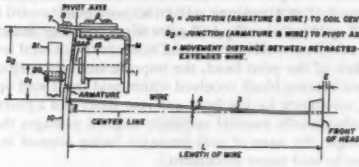
first means for selectively printing dots in a linearly aligned array having M dot positions;
second means for moving said printing means during printing;
memory means having first and second sets of inputs and being adapted for storing a plurality of data groups each data group representing a segmented dot matrix pattern wherein each segmented pattern comprises N of said linear arrays collectively forming said segmented pattern wherein each data group determines those dots within an M by N dot matrix to be printed; all of said segmented patterns having a uniform height and width;
register means for storing binary words each representative of the location of a graphic pattern in said memory means;
the output stage of said register means being coupled to a first set of inputs of said memory means;
registration means comprising means responsive to movement of said first means and being coupled to the second set of inputs of said memory means for sequentially reading out each of the N linear arrays of the segmented pattern in said memory means represented by the binary word in the output stage of said register means for applying the next code word in said register means to said memory means when the Nth linear array is read out of said storage means;
third means responsive to the completion of a line of print for advancing the paper document a first distance equal to said uniform height and for clearing said register means preparatory to receipt of the code words identifying the semented patterns for the next line of print whereby the segmented patterns of successive lines collectively form a composite graphic pattern.

3,991,869

PRINT HEAD IMPROVEMENT

Harry R. Berrey, Waynesboro, Va., assignor to General Electric Company, Waynesboro, Va.

Filed Dec. 15, 1975, Ser. No. 640,720
Int. Cl.² B41J 3/04
U.S. Cl. 197—1 R **3 Claims**



1. A printing head for a dot matrix printer to print characters on a record medium comprising at least one printing wire, means for driving said wire against a platen for printing a character comprising an annular frame having an opening, wire driving means comprising an electromagnet associated with a respective elongated armature for driving one end of such armature about a pivot axis located at the other end thereof, means for coupling said one end of said armature to one end of said wire at a junction, means for causing the wire to be driven along its longitudinal axis to an extended position against the record medium comprising means for mounting said electromagnet on said frame such that the junction is aligned with the annular opening of said frame, and with the longitudinal locus of said wire passing through said annular opening toward said platen, means for retracting said wire to a retracted position after being driven toward said record medium comprising means located along the outer periphery of said annular frame for resiliently biasing said armature in a given direction about said pivot axis so as to support said wire joined thereto in said retracted position, said retracting means comprising an elongated, flat, leaf spring rigidly attached at

one end to said frame and extending from said frame in a direction substantially perpendicular to the length of the armature and joined to the other end of said armature, a backstop for said armature, a pivot point for said spring, means for varying the degree of biasing of said armature with respect to said backstop in the retracted position of said wire comprising means for producing a bending moment in said spring about said pivot point.

3,991,870

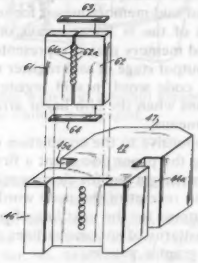
REPLACEABLE COMPOSITE WIRE GUIDE ASSEMBLY

Robert A. McIntosh, Nashua, N.H., assignor to Centronics Data Computer Corporation, Hudson, N.H.

Filed June 6, 1975, Ser. No. 584,510

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **20 Claims**



1. In a print head adapted for use in a high-speed printer of the dot-matrix type including a hollow housing having front and rear walls, said rear wall having a plurality of apertures and said front wall having an opening therein, a slender flexible print wire extending through each of said apertures to said front wall, magnetic means for selectively moving each of said print wires in reciprocating fashion to impact the free ends thereof against a paper document and guide means mounted within said housing intermediate said front and rear walls for guiding each print wire along a given arcuate path toward said front wall opening whereby said print wires converge inwardly towards said front wall opening and towards the central longitudinal axis of the print head, the improvement comprising:

a. a first bearing block received within said front wall opening, said block having front and rear faces and a plurality of substantially parallel vertically aligned passages therethrough, the axes of said passages being aligned transverse to said paper document;

b. a second bearing fixed to said block front face and having at least one passageway therethrough which is in alignment with the adjacent passages in said first bearing; said first and second bearings being formed of a relatively compliant material and a relatively hard material, respectively;

c. attachment means for releasably securing said first bearing to said housing to facilitate removal and replacement of said first and second bearings as a single unit; and

d. said print wires being slidably received in said aligned passages of said first and second bearings for selective movement therein upon actuation of said magnetic means;

said first bearing being approximately the length of said front wall opening and greater in length than said second bearing measured in said axial direction whereby said block absorbs substantially all of the sidewise forces which may be generated during actuation of the print wires and maintains the forward ends of the print wires in axial alignment in the second bearing whereby said second bearing experiences substantially only sliding forces from said print wires.

3,991,871

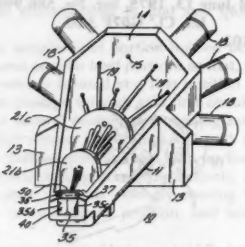
PRINT HEAD AND PLASTIC BEARINGS THEREFOR

Robert A. McIntosh, Sr., Nashua, N.H., assignor to Centronics Data Computer Corporation, Hudson, N.H.

Filed Sept. 10, 1974, Ser. No. 504,711

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **17 Claims**



1. A print head assembly comprising:

a hollow housing having a rear mounting wall and side walls tapering toward a forward nose portion;

said rear mounting wall having a plurality of apertures;

a plurality of solenoids each having its forward end secured in one of said apertures and each solenoid having an elongated reciprocating print wire extending from its forward end and through the hollow interior of the housing towards said nose;

said nose portion having an open-ended slot;

the base of said open-ended slot having a pair of spaced openings;

a bearing formed of a compliant self-lubricating plastic and having a plurality of small apertures arranged along an imaginary straight line;

each of said print wires being slidably positioned within one of said small apertures and having its forward free end extending to the front face of said bearing;

the longitudinal axes of said solenoids being aligned so that their print wires gradually merge towards said nose portion; and

a U-shaped compliant fastener having a pair of arms depending from a yoke, said fastener embracing the top and side surfaces of said bearing and having each of the free ends of its depending arms force-fitted into an associated one of said openings for releasably securing said bearing in said slot to enable replacement of said bearing.

3,991,872

TYPE ELEMENT MOUNTING FOR HIGH SPEED TYPE POSITIONING MECHANISM

Bunzo Fujio, Hanamaki; Yasushi Sasaki, Iwate, and Hiromi Takada, Hanamaki, all of Japan, assignors to Yamura Kabushikikaisha Shinko Seisakusho, Japan

Filed Mar. 17, 1975, Ser. No. 559,391

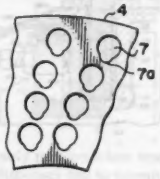
Claims priority, application Japan, Sept. 14, 1974, 49-106324

Int. Cl.² B41J *1/32*

U.S. Cl. 197—53 **1 Claim**

1. An improved type element mounting for a high speed type element positioning mechanism having a type head having therein a plurality of type elements, a type head shaft on which said type head is mounted, the type head having a spherical surface thereon through which the axis of said type head shaft extends, type elements mounted in said type head with the faces thereof on said spherical surface and movable in said type head for being projected beyond said spherical surface, said type elements lying along latitudinal circles on said surface the centers of which lie on the axis of said type head shaft, the type elements in adjacent latitudinal circles being substantially aligned along longitudinal circles extend-

ing from the point of intersection of said type head shaft axis and said spherical surface, said type head shaft being pivotally mounted for pivotal movement around a point corresponding to the center of the sphere of which said spherical surface forms a part, a type hammer positioned adjacent said type head for striking a type element for projecting it beyond said spherical surface for carrying out a printing action and lying in a plane with the axis of said type head shaft and drive means coupled to said type head shaft for rotating said shaft for rotating said type head member for aligning the type member corresponding to the character to be printed in the plane with



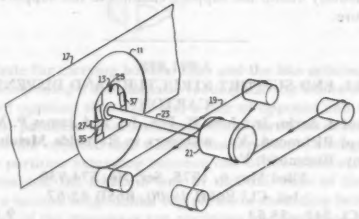
said type hammer, and for pivoting said type head shaft in said plane for aligning a type element in one of said circles with said type hammer, said improved mounting comprising said type head having circular holes therein for each of said type elements and each hole having a single semi-circular enlargement therein, and each type element having a cylindrical shape and having a single semi-cylindrical projection extending along at least part of the length thereof, the cross-sectional shape of said type element being complementary to that of said hole and the type element being guided in its movement through the hole so as to be prevented from rotating.

3,991,873

ATTACHING PRINT DISC TO DRIVE IN IMPACT PRINTERS

Gary R. Paulson, Loveland, Colo., and Ralph L. Tenbrink, Boise, Idaho, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed June 11, 1975, Ser. No. 586,109
Int. Cl.² B41J *1/30*; F16B *7/08*
U.S. Cl. 197—53 **2 Claims**



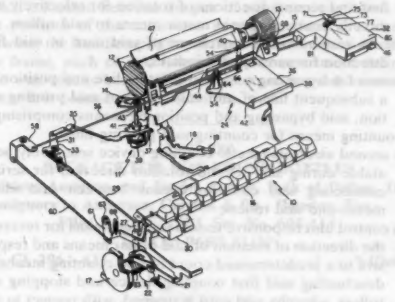
1. In an impact printer, a printing mechanism comprising:
drive means including a rotatable member;
guide means mounted on one end of said rotatable member for providing a guiding surface substantially perpendicular to the axis of said rotatable member;
tensioning means on said guide means for providing a locking force; and
a print disc removably mounted on said guide means for engagement with said tensioning means to provide insertion onto and removal from said rotatable member in a direction substantially perpendicular to the axis of said rotatable member.

3,991,874

AUTOMATIC FUNCTION MECHANISM FOR TYPEWRITERS

Stanley J. Kiem, Cortland, N.Y., assignor to SCM Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,647
Int. Cl.² B41J *19/62, 33/02*
U.S. Cl. 197—91 **26 Claims**



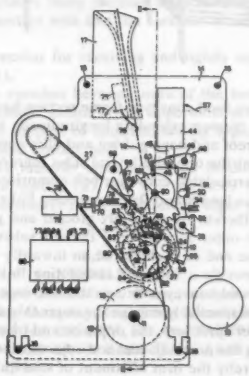
1. In a typewriter which includes operational means for said typewriter to perform at least one typewriter function for causing the alignment of selected platen impact point relative to the typewriter print point and having means for receiving a cartridge comprising:
means disposed in the typewriter and engageable by the cartridge for actuating said operational means upon removal of the cartridge from the typewriter to thereby perform at least a selected one of said functions.

3,991,875

DEVICE FOR MOVING CARDS OR SEPARATE FORMS IN AN ACCOUNTING MACHINE

Adriano Zambolin, Ivrea (Turin), and Dario Bisone, Montalto Dora (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Nov. 20, 1974, Ser. No. 525,735
Claims priority, application Italy, Dec. 27, 1973, 70859/73
Int. Cl.² B41J *13/03*
U.S. Cl. 197—127 R **2 Claims**



1. A driving device for controlling the movement of cards or separate forms with respect to a printing station for accounting machines and the like, comprising:

motor means operable for rotating in a first and in a second direction,

indicia stored on said card for determining the position of the next line to be printed on said card,

a plurality of rollers actuated by said motor for moving said card along a predetermined number of printing lines in a first or in a second direction according to the direction of said motor means,

a first electromagnetic coupling device actuable during said first and second directions of rotation for selectively and directly connecting said motor means to said rollers,

means responsive to movement of said card in said first direction for sensing said indicia,

means for bypassing said next printing line and positioning a subsequent line of said card adjacent said printing station, said bypassing and positioning means comprising

counting means for counting said printing lines,

a second electromagnetic coupling device selectively actuatable during said second rotation direction for serially connecting said counting means between said motor means and said rollers,

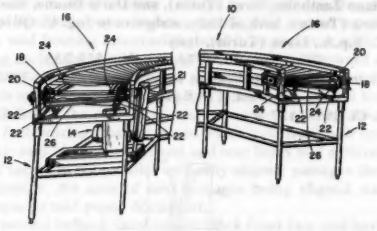
a control unit responsive to said sensing means for reversing the direction of rotation of said motor means and responsive to a predetermined count of said counting means for deactuating said first coupling device and stopping said rollers, whereby said card is stopped, with respect to said printing station, at a subsequent printing line below said next line in accordance with said count of said counting means.

3,991,876

SANITARY LINKAGE CONNECTION MEANS FOR FOOD PRODUCTS PROCESSING CONVEYOR

Jacob Schmidt, Sr., and Jacob Schmidt, Jr., both of R.D. No. 1, Harleysville, Pa. 19438

Filed Apr. 25, 1975, Ser. No. 571,806
Int. Cl.² B65G *15/00*
U.S. Cl. 198—831 **3 Claims**



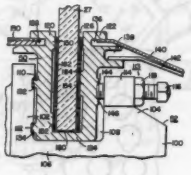
1. A sanitary food conveyor frame section having elongated guide means thereon extending longitudinally between opposite ends thereof and having drive and idler sprockets respectively adjacent the opposite lateral sides thereof, in combination with an articulated conveyor belt comprised of a series of rods of similar length and flat connecting links firmly affixed respectively thereto by smoothly ground and polished weldments at the outer forward end thereof substantially transversely to one end of each rod at an inwardly inclined angle thereto to provide a shingled connecting link assembly for each side of said conveyor belt so that the inner side surfaces of said links respectively engage the outer side surfaces of said drive and idler sprockets, the opposite end of each link pivotally receiving the next adjacent rod adjacent the rearward end thereof, whereby the firm affixment of said links to said rods supports the opposite ends of said links in close slidable relationship with each other and thereby provides no appreciable spaces or surfaces within or upon which food particles may lodge or adhere and said conveyor is easily cleaned and maintained in a sanitary condition.

3,991,877

TRANSPORTATION APPARATUS

Joseph K. Kraft, and Iber C. Courson, both of Gettysburg, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 20, 1975, Ser. No. 551,559
Int. Cl.² B66B *9/12*
U.S. Cl. 198—335 **15 Claims**



1. Transportation apparatus for transporting persons between spaced landings, comprising:

a support structure,

a load bearing conveyor mounted on said support structure,

a balustrade,

and means supporting said balustrade on said support structure,

said balustrade including a plurality of vertically oriented panel members aligned in end-to-end relation to define a substantially continuous bottom edge portion,

said means mounting the balustrade on the support structure including a support channel and a plurality of clamp means, with said clamp means being mounted in spaced relation on the support structure, and with said support channel being disposed in said spaced clamp means,

said support channel including first and second spaced leg portions and a bight which cooperatively define an elongated recess having a length dimension selected to receive substantially the complete length of the bottom edge portion defined by the aligned panel members,

said plurality of clamp means applying bending forces to said support channel which cooperate to provide a clamping force on said panel members along substantially the complete length of said support channel, to clamp the panel members in the support channel and to simultaneously clamp the support channel to the support structure.

3,991,878

ROLL END SUPPORT STRUCTURE AND DISPENSING CARTON

Vincent J. Serio, Jr.; John H. Fox, Jr., and James P. Martin, all of Richmond, Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed May 6, 1975, Ser. No. 574,930
Int. Cl.² B65H *19/00;* **B65D** *85/67*
U.S. Cl. 242—55.53 **9 Claims**

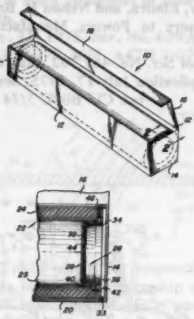
1. A support structure for insertion into the hollow core of a dispenser roll for sheet material disposed within a carton having polygonal ends which comprises:

a. a first support member having a polygonal base corresponding substantially in size and shape to the polygonal ends of said carton and a cylindrical body portion,

b. a second support member having a cylindrical body portion rotatably received on said cylindrical body portion of said first support member,

c. said first and second support members having interengaging locking means to substantially prevent axial movement in two directions of said second support member with respect to said first support member, and

d. said cylindrical body portion of said second support member being sized to permit frictional engagement of



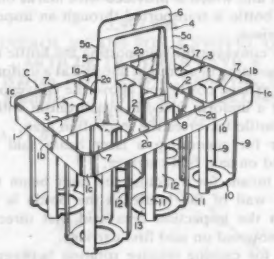
said cylindrical body portion when inserted into the hollow core of said dispenser roll to permit dispensing of said sheet material.

3,991,879

CRATE FOR CARRYING BOTTLES, CANS OR THE LIKE ARTICLES

Kashichi Hirota, Hachioji, Japan, assignor to Kyowa Electric & Chemical Co., Ltd., Hachioji, Japan

Filed Oct. 14, 1975, Ser. No. 621,741
Claims priority, application Japan, Oct. 22, 1974, 49-121813
Int. Cl.[2] B65D *81/26*
U.S. Cl. 206—203 6 Claims



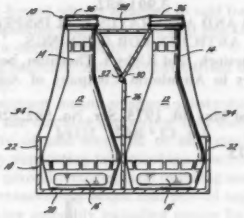
1. Crate for carrying bottles, cans and the like articles, said crate comprising a substantially rectangular top frame having a pair of opposed side walls and a pair of opposed end walls, a pair of parallely spaced transverse top partitions extending between the opposed side walls of the top frame, a longitudinal top partition extending between one of the transverse top partitions and the adjacent one of the end walls of the top frame, a second longitudinal top partition extending between the other of the transverse top partitions and the other of the end walls of the top frame, each intersection between the associated transverse and longitudinal top partitions being in the form of a V-shaped cross-section which opens toward the other transverse top partition, a handle including a pair of substantially upright portions each extending upwardly from each of said intersections between the associated transverse and longitudinal top partitions, and a horizontal portion extending between the pair of upright portions, each of said upright portions including a pair of side walls connected along a ridge to form a V-shaped cross-section which is continuous with and merges into the V-shaped configuration at the associated intersection between the transverse and the longitudinal top partitions, the depth of the V-shape in each upright portion of the handle being gradually decreased upwardly with the ridge inclined inwardly, end compartment defining side wall means extending downwardly from an opening defined by each interconnected side and end walls of the top frame and the transverse and longitudinal top partitions, said wall means being slightly converged toward lower end where it is connected with a bottom wall, two separated intermediate compartment defining side wall means each extending downwardly from the portion of each side wall of the top frame which is located between the pair of transverse partitions, and the portions of the transverse partitions which are located between the handle upright portions and the side wall of the top frame, each of said intermediate compartment defining side wall means being slightly converged toward lower end where it is connected with a bottom wall.

3,991,880

PACKAGE FOR NON-ROUND BOTTLES

Andrievs Austrins, and Daniel A. Leo, both of Dallas, Tex., assignors to Anderson, Clayton & Co., Houston, Tex.

Filed Aug. 15, 1975, Ser. No. 605,114
Int. Cl.[2] B65D *85/30*
U.S. Cl. 206—431 9 Claims



1. A package for non-round bottles, comprising,

a. a plurality of non-round glass bottles aligned in at least two rows, each bottle

i. having a substantially elliptical horizontal cross-sectional configuration main body portion tapering upwardly and inward in at least one plane to form a neck, and

ii. having a substantially flat surface on each of opposed sides of the shorter dimensional horizontal cross-sectional configuration of the main body portion (i), said flat surfaces being parallel so as to mate in glass-to-glass contact with like flat surfaces of other such bottles,

b. a tray member for receiving and tightly supporting the bottles (a),

c. a divider member between rows of the bottles (a) and having cushion means at the uppermost portion thereof for lateral support of and maintaining separation of the necks of said bottles, and

d. a film-like member enveloping and holding tightly together the bottles (a), the tray member (b), and the divider member (c) in a substantially rigid package.

3,991,881

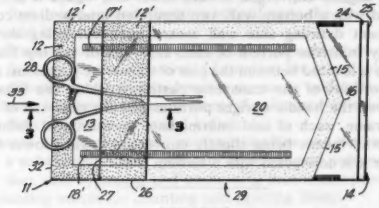
STERILE PACK

Thomas A. Augurt, Stamford, Conn., assignor to Propper Manufacturing Company, Inc., Long Island City, N.Y.

Filed Jan. 21, 1975, Ser. No. 542,878
Int. Cl.[2] B65D *85/70*; B65B *55/10*; A61B *19/02*
U.S. Cl. 206—439 7 Claims

1. A sterile pack blank comprising a substrate of predetermined porosity, a discrete plastic film overlying said substrate, said substrate and film being adhesively connected for defining an enclosure therebetween, said enclosure including a sealable inlet thereto, said enclosure defined between said

adhesively connected substrate and film having interior and exterior side walls, and at least one pair of sterilization indicators located in said substrate, one member of said pair being



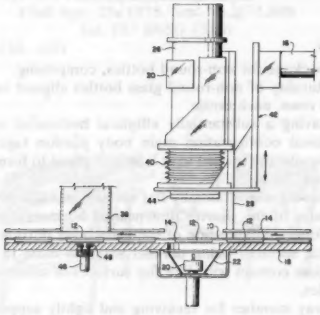
arranged on said exterior side wall of said enclosure, and said other member of said pair being arranged on said interior side wall of said enclosure, the two members of each pair of sterilization indicators overlying each other.

3,991,882

METHOD AND APPARATUS FOR INSPECTING ARTICLES FOR OPENINGS

Melvin R. Fahnestock, and Kirby I. Thornton, both of Apollo, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed May 30, 1975, Ser. No. 582,226
Int. Cl.² B07C 5/344
U.S. Cl. 209—73 **9 Claims**



1. Apparatus for inspecting a series of opaque articles for openings therethrough comprising:

stationary means for producing optical radiation;

stationary means for detecting optical radiation;

conveying means for presenting articles seriatim in a predetermined position between said radiation producing means and said radiation detecting means;

an extensible opaque conduit with one end thereof secured on said radiation detecting means and the other end having a sealing means thereon for producing light tight engagement against an article around the area thereof to be inspected for openings;

means for extending said conduit to engage said sealing means in light tight engagement against each article as it is presented for inspection, and for contracting said conduit after inspection of the article; and

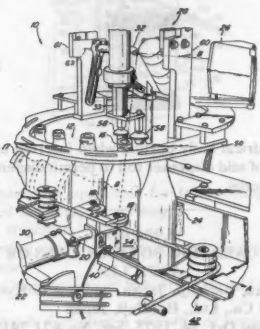
means for activating said detecting means upon achieving said light tight engagement of said conduit against each article and for inactivating the detecting means prior to breaking said light tight engagement.

3,991,883

METHOD AND APPARATUS FOR IDENTIFYING A BOTTLE

Ross L. Hobler, Elmira, and Nelson H. Bryant, Ithaca, both of N.Y., assignors to Powers Manufacturing Incorporated, Elmira, N.Y.

Continuation of Ser. No. 467,702, May 6, 1974, abandoned.
This application July 17, 1975, Ser. No. 596,697
Int. Cl.² B07C 5/34
U.S. Cl. 209—73 **14 Claims**



1. Apparatus for identifying a bottle which is transparent to a laser beam and which is provided with marks on its bottom wall, as the bottle is transported through an inspection area, which comprises;

a. a linear conveyor for transporting the bottle through the inspection area in a straight line and at a uniform speed;

b. a first carriage positioned above the conveyor for movement at a uniform speed in synchronism with the bottle as the bottle traverses the inspection area;

c. a laser for generating a laser beam said laser being mounted on said first carriage;

d. a first means for directing the laser beam through the bottom wall of the bottle as the bottle is transported through the inspection area said first directing means being mounted on said first carriage;

e. means for causing relative rotation between the bottle and the laser beam as the bottle is transported through the inspection area so that the beam scans selected portions of the bottom of the bottle;

f. a second carriage positioned adjacent to the conveyor said second carriage being mounted for movement in synchronism with the first carriage and the bottle as the bottle is transported through the inspection area;

g. a sensor for selectively receiving the laser beam after the beam has emerged from the bottom wall of the bottle and for generating a signal in response thereto, the sensor being mounted on the second carriage, the sensor including a photocell for generating an electric signal in response to the laser beam and a mask positioned between the photocell and the bottom wall of the bottle to block the lasar beam from striking the photocell when the beam does not strike a mark on the bottom wall of the bottle;

h. second means positioned below said conveyor for directing the laser beam to the sensor after the laser beam has emerged from the bottom wall of the bottle; and

i. an electric control circuit responsive to the signal generated by the sensor, for selectively activating an ejector to eject a bottle whose marks cause a particular signal to be generated by the sensor.

3,991,884

ARTICLE BIASING DISPLAY ROD

Howard E. DeMaagd, Grand Rapids, and Thomas W. Sloan, Spring Lake, both of Mich., assignors to John Thomas Batts, Inc., Zeeland, Mich.

Filed Dec. 11, 1975, Ser. No. 639,855
Int. Cl.² A47F 3/08; A47H 1/02
U.S. Cl. 211—1.5 20 Claims

13. An elongated, rigid means for suspending hook supported article hangers in spaced relationship along an elongated axis, said means having a plurality of parallel channels in one face thereof, said channels being at an acute angle to the elongated axis, said means having a plurality of identical channels in the opposite face thereof, each of the channels in the one face being in the same plane as one of the channels in the opposite face whereby inversion of said means will reverse the direction of angularity of garment hangers suspended therefrom.

14. The means for suspending hook supported article hangers as described in claim 13 wherein said channels in one face are separated from said channels in the opposite face by a pair of diametrically positioned smooth surfaces extending lengthwise of said means, an actuation member connected to said means for rotating the same.

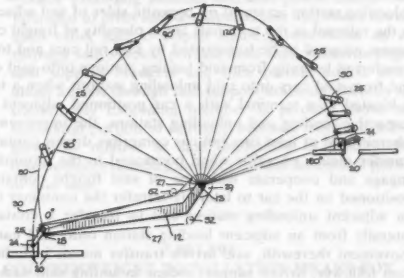
16. The means for suspending hook supported article hangers as described in claim 14 wherein said actuation member comprises a motor drivingly connected to said means.

3,991,885

PATH CONTROL MEANS FOR A SWIVEL OPERATED ARTICLE TRANSFER DEVICE

William H. Warren, 729 S. Main St., Centerville, Mass. 02632

Filed Jan. 27, 1975, Ser. No. 543,988
Int. Cl.² B65G 47/26
U.S. Cl. 214—1 BV 12 Claims



1. In an article transfer device having a pivotally mounted lifter arm means carrying an article lifter member along a curved path from a pick-up position to a placing position an improved means for adjusting the curved path comprising:

an orbit arm having one end pivotally connected to the lifter arm means and the other end connected to the lifter member; and

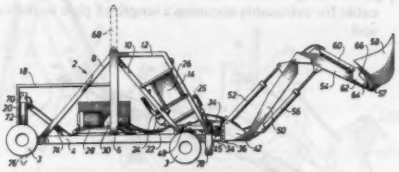
means operatively engaging said orbit arm for turning said orbit arm responsive to movement of the lifter arm means.

3,991,886

SHAFT MUCKER

Torgny Thorsell, Skelleftea, Sweden, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed Aug. 5, 1974, Ser. No. 469,667
Claims priority, application Belgium, May 13, 1974, 144253
Int. Cl.² B65G 67/04
U.S. Cl. 214—1 MS 12 Claims



1. In a shaft mucker for mucking in declined shafts comprising

an elongated machine frame having a fore end and a rear end,

non-track-bound wheels attached to said frame for carrying and supporting said frame and said mucker upon the foot wall of a declined shaft,

a mucking assembly and a bucket carried by said mucking assembly,

a pivotal support means arranged substantially perpendicularly to the machine supporting foot wall at the forward extremity of said fore end of said machine frame for pivotally supporting said mucking assembly,

means for pivotally moving said mucking assembly and said bucket transversely about said pivotal support means,

said mucking assembly including means for extending and retracting and for raising and lowering said bucket with respect to said frame,

anchoring means comprising support legs hydraulically extendable and withdrawable in the machine frame for anchoring the machine against the walls of the shaft during mucking and including at least one leg for engagement with the hanging wall of the shaft and at least one leg for engagement with the shaft foot wall,

a winch drum mounted at the rear end of said machine frame,

means for driving and operating said winch drum from said mucker for controllably lowering the mucker into a declined shaft and for raising the mucker by means of an associated cable.

3,991,887

METHOD AND APPARATUS FOR MOVING DRILL PIPE AND CASING

Norman L. Trout, 602 N. Broadway, Sayre, Okla. 73662

Filed Feb. 24, 1975, Ser. No. 552,698
Int. Cl.² E21B 19/00
U.S. Cl. 214—2.5 12 Claims

1. A pipe-handling apparatus for moving drill pipe and casing back and forth between a position reclining on a horizontal drilling rig pipe rack and a position on the rig floor of the drilling rig, comprising:

a support frame;

a bifurcated mast having first and second ends and pivotally secured at the first end thereof to the support frame;

clamping means carried by the support frame for securing the support frame to the drilling rig pipe rack whereby the mast may rotate relative to the support frame about a horizontal axis;

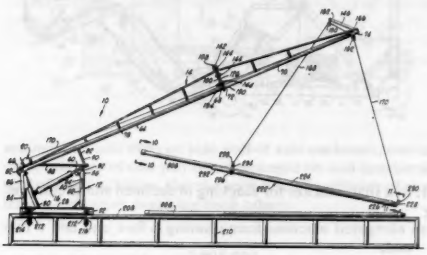
power cylinder means interconnecting the support frame and the bifurcated mast for rotating the mast about the axis of pivotal securement to the support frame;

a first power winch carried by the support frame adjacent the first end of the bifurcated mast;

sheave means mounted on the second end of the bifurcated mast for rollingly supporting a cable passing thereover;

a cable secured at one end thereof to the first power winch and extending over the sheave means with the opposite end of the cable depending from the second end of the bifurcated mast;

pipe securing means carried on the opposite end of the cable for releasably securing a length of pipe to the cable; and



control system means for controlling the extension and retraction of the power cylinder to swing the second end of the bifurcated mast from a position extending over the rig pipe rack to a position adjacent to the floor of the drilling rig and, alternately, from a position adjacent to the floor of the drilling rig to a position extending over the drilling rig pipe rack, and for controlling the operation of the first power winch to alternately wind and unwind the cable thereon.

3,991,888

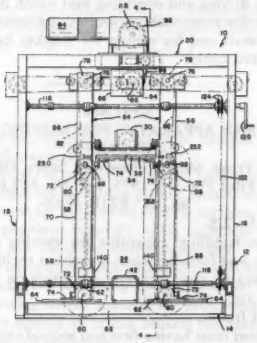
PAN UNSTACKER

Herbert Jean-Pierre Beckius, York, and Richard Bernard Goodhart, New Freedom, both of Pa., assignors to Alto Corporation, York, Pa.

Filed Sept. 10, 1975, Ser. No. 611,865

Int. Cl.[2] B65G *59/04*

U.S. Cl. 214—8.5 A **24 Claims**



19. An unstacker comprising a main support frame; means for supporting a stack of articles at a lift position in the frame; a discharge conveyor located on the support frame having a lower run passing over the lift position and extending outwardly of the support frame; a pair of moveable frames located to either side of the discharge conveyor at an article pick up position; elevator means supported by the main frame for lifting the stack of articles at the lift position toward the discharge conveyor to position the top article in the stack at the pick up position below the discharge conveyor; an article lift assembly lift assembly on each moveable frame normally positioned above the lower run of the discharge conveyor and extendable downwardly to the pick up position to engage the top article of the stack of articles and retractable above the discharge conveyor to strip the top article onto the conveyor for movement by the conveyor outwardly of the unstacker; drive means for the lift assemblies on the support frame; means for laterally adjusting the moveable frames with respect to the discharge conveyor to locate the lift assemblies thereon for engagement with selective portions of the top article of the stack of articles; and a drive connection between the drive means and the lift assemblies operable to raise and lower the lift assemblies while permitting lateral movement of the moveable frames.

3,991,889

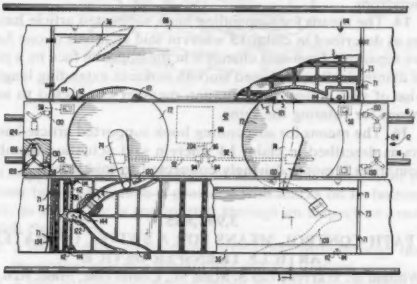
RAILWAY TRANSPORTATING SYSTEM AND APPARATUS THEREFOR

Robert E. Cox, 19004 Oxcart Place, Gaithersburg, Md. 20760

Filed Apr. 15, 1975, Ser. No. 568,348

Int. Cl.[2] B65G *67/02*

U.S. Cl. 214—38 B **42 Claims**



1. For use in a railway transportation system for moving containerized freight between terminals along a railroad and for handling the containers at the terminals, at least one rail car for movement along the railroad, at least one loading and unloading station arranged on opposite sides of and adjacent to the railroad at the terminals and a plurality of freight containers adapted to be transported by said rail cars and to be transferred laterally from said loading stations onto said cars and from said cars onto said unloading stations when a train is located at a terminal with a car positioned adjacent the respective loading and unloading stations, the improvement wherein said at least one rail car comprises driven container transfer means operable when positioned in the terminal to engage and cooperate with one of said freight containers positioned on the car to laterally transfer the container onto an adjacent unloading station and to transfer a container laterally from an adjacent loading station onto said car for movement therewith, said driven transfer means including a cam follower, driven support means mounting said cam follower for rotation about a substantially vertical axis in an endless path extending across and projecting laterally from each side of the rail car, said containers each comprising a base, cam track means on the base and extending in a contoured path across the full width thereof and terminating in an open end at each side of the container, means operable to drive said support means and said cam follower mounted thereon about said path to engage said cam follower with one open end of said cam track of a container positioned on an adjacent loading station when the train is positioned in a terminal and to cooperate with said cam track to laterally transfer the container onto the car and to transfer a container

from a car onto an adjacent loading station, and retaining means on said car operable to releasably retain said containers on said car for movement therewith.

3,991,890

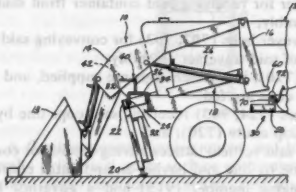
TRACTOR MOUNTED IMPLEMENT DEVICE

Eldon M. Frank, Lake View, Iowa, assignor to F & W Company, Inc., Lake View, Iowa

Continuation-in-part of Ser. No. 260,465, June 7, 1972, Pat. No. 3,863,786. This application Feb. 3, 1975, Ser. No. 546,434

Int. Cl.² E02F *3/72*

U.S. Cl. 214—131 A **13 Claims**



3. In combination, an implement mountable on a tractor, comprising,

an implement having a boom with a ground-engaging tool on the outer end and pivotally mounted to upright standards at its inner end carried on a U-shaped frame and power means interconnects said U-shaped frame and boom for relative pivotal movement therebetween, said U-shaped frame having a transversely extending member and a stand connected to said U-shaped frame for cooperation with said tool for supporting said implement independently of said tractor,

a tractor having oppositely disposed rear side support brackets for engagement with said standards, and

a step having vertical and horizontal portions on said tractor whereby upon said vertical portion engaging said transversely extending member and said power means being operated to pivot said U-shaped frame and boom towards each other said U-shaped frame pivots about an axis through said vertical portion until said standards engage said support brackets and then pivotal action occurs about an axis through said support brackets whereby said transversely extending member is pivoted above said horizontal portion of said step and said tractor is moved forwardly relative to said implement to position said transversely extending member on said horizontal portion of said step.

3,991,891

COUNTERWEIGHT INSTALLATION MEANS FOR LOADERS AND THE LIKE

John A. Cox, Aubonne, Switzerland, assignor to Caterpillar Tractor Co., Peoria, Ill.

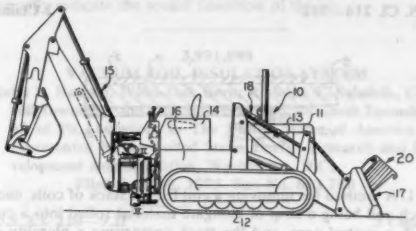
Filed Dec. 22, 1975, Ser. No. 643,422

Int. Cl.² E02F *3/00*

U.S. Cl. 214—142 **15 Claims**

1. In an earthmoving apparatus having a drive machine, a first earthmoving structure mounted to an end of the drive machine, a second earthmoving structure, mounting structure on the opposite end of the drive machine for removably mounting the second earthmoving structure to said opposite end of the drive machine, and a counterweight for counterbalancing the apparatus, improved counterweight mounting means comprising

means for selectively mounting the counterweight to the



first earthmoving structure, the second earthmoving structure, and said mounting structure.

3,991,892

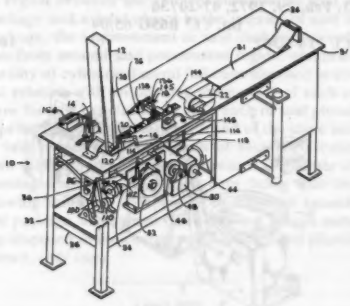
METHOD FOR EXTRACTING CONTENTS OF A PACKAGE

Wallace Loyd Rowland, Jr., Petersburg, Va., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Mar. 27, 1975, Ser. No. 562,740

Int. Cl.² B65G *65/04*

U.S. Cl. 214—152 **6 Claims**



1. A method of extracting articles from a substantially parallelepiped package having inner and outer wrappings wherein the outer wrapping encloses the inner wrapping except at one end thereof and the inner wrapping encloses and overlaps the articles to provide a leading edge extending longitudinally along one major surface thereof comprising the steps of:

a. placing the package with the one major surface thereof up;

b. intermittently moving said package in a direction substantially transverse to its longitudinal axis;

c. holding the inner wrapping and articles therein substantially motionless during a first dwell period while removing the outer wrapping in the direction opposite the one end; and

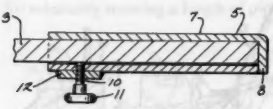
d. gripping the inner wrapping along the leading edge and rolling the inner wrapping away from the articles during a second dwell period, while holding the contents of the package essentially stationary, thereby freeing the articles therein.

3,991,893

COIL LIFTING APPARATUS AND METHOD

Jack M. Lynch, 8360 S. 13th St., Oak Creek, Wis. 53154

Division of Ser. No. 471,227, May 20, 1974, Pat. No. 3,930,585. This application July 24, 1975, Ser. No. 598,596
Int. Cl.² B65G 59/02; B66F 9/18
U.S. Cl. 214—152 2 Claims



1. A method for removing a coil from a stack of coils, each such coil being a strip of elongate material rolled into a coil with a central core, and the stack comprising a plurality of such coils stacked with their central cores generally aligned with one another, said method comprising the steps of:

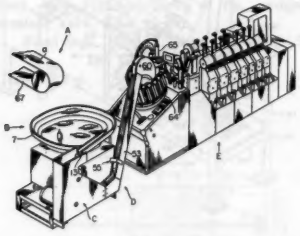
1. offsetting the top coil from the remaining coils in the stack so that it has a portion overhanging the aligned cores of the remaining coils in the stack, and
2. engaging said overhanging portion of the top coil and lifting said coil from the stack.

3,991,894

APPARATUS FOR AUTOMATIC COP FEEDING

Isamu Matsui; Shoji Sakai; Susumu Tsukada, and Susumu Kawarabayashi, all of Kyoto, Japan, assignors to Murata Kikai Kabushiki Kaisha, Japan

Division of Ser. No. 278,466, Aug. 7, 1972, Pat. No. 3,945,488. This application Apr. 2, 1975, Ser. No. 564,297
Claims priority, application Japan, Feb. 29, 1972, 47-20733; Feb. 29, 1972, 47-20736
Int. Cl.² B65G 65/04
U.S. Cl. 214—302 10 Claims



1. An apparatus for automatically feeding cops to a cop supply device, cooperative with an automatic winder, in such a manner that the head and tail positions of said cops are adjusted or controlled, said apparatus comprising:

a cop sequencing device (B) of a high frequency vibration type for receiving cops fed thereto at random and for discharging said cops separately one by one in sequence; and means for feeding cops to said sequencing device;

a cop conveyer (401) for conveying cops issued from said cop sequencing device one by one and dropping them therefrom;

a receiver chute (423) which receives cops dropped from said cop conveyer without changing the direction of the cops;

an endless conveyer (511) provided with an L-shaped lattice (512), moved in operation laterally with respect to the moving direction of said cop conveyer (401) so that cops issued from said receiver chute (423) are discharged on said endless conveyer (511) and are brought under a cop container (502);

a cop container (502) disposed above said endless conveyer (511) and provided with an L-shaped turnable lever (555) controlled to open or close the bottom of the container (502);

a closure member (557) operated by said lever for opening said bottom for issuance of the cops or closing of said bottom for encasement of the cops;

a cop boxing means (600), disposed beyond said endless conveyer (511), for lifting a prescribed number of cops into the container so that said prescribed number of cops are successively encased in the container;

a container let-off belt (564), disposed downstream of said endless conveyer (511), for moving the container toward a following supply station (700);

a traverser assembly (800) for conveying said container in a filled or empty condition from the let-off belt (564);

a vertical lattice (724) disposed in the vicinity of the automatic winder for receiving said container from said traverser assembly;

a pair of conveyer belts (702, 703) for conveying said container out of said traverser assembly;

a cop chute (720), into which cops are supplied, and from which said cops are fed;

vertical lattices (724, 903) receiving said cops one by one from said cop chute (720); and

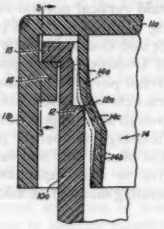
one (903) of said vertical lattices having means for conveying cops one by one and having an apparatus consisting of an engaging member (913) and a governor block (914) at a delivery side of said one lattice for positioning said cops so that the tops and bottoms of all cops are positioned in alignment.

3,991,895

MOISTURE-PROOF CONTAINER SEAL

Theodore Wayne Thornton, 2036 Laird Drive, Salt Lake City, Utah 84108

Filed Feb. 20, 1976, Ser. No. 659,592
Int. Cl.² B65D 55/02, 85/56; A61J 1/00
U.S. Cl. 215—211 16 Claims



1. A moisture-proof container, comprising a receptacle having a circular entryway with an open mouth adapted to receive a cover; a cover for the open mouth; an elongate, inherently resilient, plastic skirt extending from the underside of the cover for insertion within said entryway when the cover is applied to the receptacle; mutually confronting and coacting annular formations that are resiliently pressed together intermediate the length of the skirt, internally of the container when closed, one of said formations having a sharp edge as a circular seat, the other having a smooth, circular, seating face for coaction with said sharp edge in establishing circular, sealing, line contact between the two; and means for tightly retaining the cover on the receptacle.

3,991,896

STOPPER ASSEMBLY

Eduardo V. Miranda, Huntington Beach, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 402,951, Oct. 3, 1973, Pat. No. 3,888,113.
This application Nov. 27, 1974, Ser. No. 527,935
Int. Cl.[2] B65D *39/00*
U.S. Cl. 215—227 3 Claims

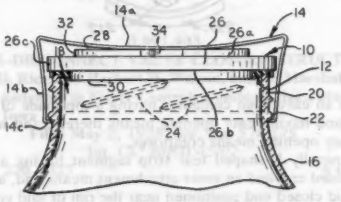
1. A flexible stopper having upper and lower surfaces, a generally cylindrical outer surface with substantially straight sides and upper and lower cavities, said lower cavity being generally spherical and having a downwardly disposed opening at said lower surface with a width less than the diameter of said spherical cavity, said upper cavity having an upwardly disposed opening at said upper surface and being separated from said lower cavity by a thin, flexible membrane.

3,991,897

CANNING JAR LID AND SEALING SYSTEM

Ronald B. Meyers, 1750 Augusta, Eugene, Oreg. 97403

Filed Oct. 2, 1975, Ser. No. 618,817
Int. Cl.[2] B65D *45/04*
U.S. Cl. 215—230 8 Claims



4. In a canning jar sealing system the improvement comprising:

a canning jar lid having a generally disc-shaped rigid main body portion with parallel opposed surfaces,

each said opposed surface having an integral raised boss portion positioned centrally thereon and spaced radially inwardly of the outer periphery thereof such that said main body portion defines a peripheral flange for overlying the rim of the mouth of a canning jar with either one of said surfaces supported on said rim and a corresponding one of said boss portions extending inwardly of the jar mouth,

the diameter of one of said boss portions being greater than the diameter of the other said boss portion for accommodating jars of different mouth diameters.

a thin flat, resilient elastic sealing ring encircling snugly one said boss portion and adapted to encircle snugly the other said boss portion when inserted into the jar mouth to form an air seal between the jar rim and said peripheral flange,

said jar lid being composed of a light-transmitting material,

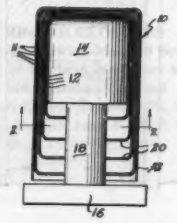
The peripheral edge surfaces of said boss portions each having at least one indentation therein visible from the outer surface of said lid whereby a portion of said sealing ring enters said indentation of the ring-encircled boss portion within the jar mouth upon creation of a partial vacuum within the jar to visually indicate the sealed condition of the jar.

3,991,898

VACUUM FOIL INSULATION SYSTEM

John P. Hanson, White Oak Boro; Rudolph E. Sabolcik, Carroll Township, and Robert C. Svedberg, Elizabeth Township, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 16, 1975, Ser. No. 613,780
Int. Cl.[2] B65D *25/18*
U.S. Cl. 220—9 D 3 Claims



1. In a metal foil insulation package having a penetration region at one end to allow communication through said penetration region between the ambient surrounding said insulation package and a solid object in the interior of said insulation package, the improvement in said package for reducing heat loss from around said penetration region, comprising

a plurality of cylindrical metal foil cups disposed in concentric relation with an opening at one end of each cup to allow for said penetration region, each of said plurality of cups having a skirt integral with and of the same material as said plurality of cups, each of said skirts extending from said one end of said cup towards the center of said opening, each of said skirted cups being split thereby allowing said cups to open up to facilitate assembly of said package, and at least one unskirted, unsplit metal foil cup disposed in concentric relation with said plurality of skirted, split cups.

3,991,899

CYLINDRICAL PRESSURE CHAMBER FOR NUCLEAR REACTOR OR THE LIKE

Franz Vaessen, Essen-Bredeney, Germany, assignor to Hochtief AG fur Hoch- und Tiefbauten, Essen, Germany

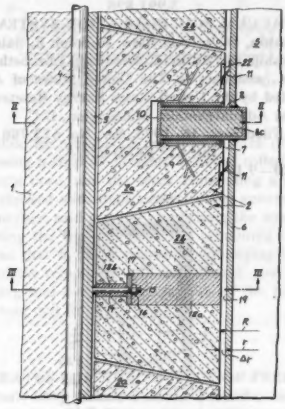
Filed Oct. 22, 1974, Ser. No. 517,014
Claims priority, application Germany, Oct. 24, 1973, 2353179
Int. Cl.[2] B65D *25/18*
U.S. Cl. 220—15 7 Claims

1. A pressure chamber for confining a hot expanding fluid, comprising:

a cylindrical structure including a layer of low thermal conductivity;

a cylindrical shell of metal within said structure coaxial with said layer and spaced therefrom in an unoperated state by an annular clearance enabling radial expansion of said shell under pressure of said fluid, the depth of said clearance being sufficient to enable pretensioning of said shell in peripheral direction for reducing thermally induced stresses in said shell upon contact thereof with said layer to less than the yield point of said metal; and

countersunk guide means on said layer engaging said shell for maintaining said clearance in the absence of fluid pressure and facilitating said radial expansion with substantially complete elimination of said clearance, said structure comprising a refractory wall provided with a metallic lining surrounding said layer, said lining being provided with anchor means engaging said layer, said



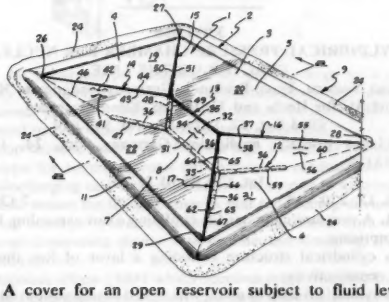
layer being axially subdivided into a plurality of tiers of sectoral blocks of trapezoidal axial cross-sections converging alternately outwardly and inwardly on adjoining tiers, said anchor means engaging the blocks with outwardly converging cross-sections, said guide means comprising lost-motion couplings partly received in at least some of the blocks with inwardly converging cross-section.

3,991,900

RESERVOIR COVER AND CANALIZING MEANS

Norman R. Burke, Los Gatos; Drace W. Kutnewsky; Virgil C. Price, both of San Jose, and Dennis H. Gerber, Los Gatos, all of Calif., assignors to Burke Industries, Inc., San Jose, Calif.

Filed Oct. 1, 1975, Ser. No. 618,457
Int. Cl.² B65D *87/18*
U.S. Cl. 220—219 **16 Claims**



1. A cover for an open reservoir subject to fluid level change comprising:

a. a flexible sheet of fluid impervious material of sufficient area to substantially cover the sidewalls and bottom of said reservoir when said reservoir is substantially empty;

b. connection means connecting said cover to the upper periphery of said reservoir;

c. canalizing means creating a plurality of folds in said flexible cover at pre-selected fixed horizontal positions forming defined narrow and generally vertically elongated surface water canals over the entire range of fluid level conditions and forming said sheet in defined generally taut substantially horizontal surface portions supported on the fluid in said reservoir by displacement of fluid;

d. said canals are dimensioned to receive, store and channel surface water separate and apart from the fluid below said cover and in sufficient quantity to prevent substantial build up of surface water on said horizontal surface portions;

e. said canalizing means is constructed to form interconnecting canals which closely approach or intersect the side of said reservoir and maintain said interconnections during normal raising and lowering of the cover surface;

f. said canalizing means includes elongated weights connected to said sheet forming the lowermost portion of said canals;

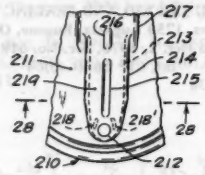
g. said canal consists of a generally straight line along a substantial mid-portion of said reservoir and four intersecting canals each intersecting a corner of said reservoir and an end of said mid-portion canal.

3,991,901

CONTAINER OPENING SEGMENT WITH ATTACHMENT

Walter Merton Perry, 76 Locust Hill Road, Darien, Conn. 06820

Continuation-in-part of Ser. No. 354,807, April 26, 1973, Pat. No. 3,908,856. This application Sept. 26, 1975, Ser. No. 617,002
Int. Cl.² B65D *41/32*
U.S. Cl. 220—269 **14 Claims**



1. In an easy open container having a top made of ductile metal and having easy opening means therein, and in which said easy opening means comprises,

a generally U-shaped tear strip segment having an outer closed end and an inner attachment means end, and with said closed end positioned near the rim of said container top, and with the sides of said tear strip segment extending toward the inner region of said container top,

said tear strip segment defined by a weakening score line extending around the periphery of said U-shaped tear strip segment except at said attachment means end, where said score line is interrupted to provide an unscored section of top material to serve as said attachment means between said tear strip segment and said container top after opening,

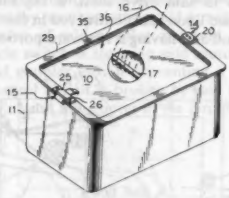
a lift tab secured to said tear strip segment near said closed end, and for applying manual lifting force to tear said tear strip segment to open said container top, and

an integral double edge fold band formed in the material of said tear strip segment and extending along the periphery of said tear strip segment, and said double edge fold band being an integral part of said tear strirp segment, and wherein the outermost rounded folded edge of said double edge fold band extends along and substantially parallel to and near said score line, and provides protection from the sharp torn edge of said tear strip segment after opening of said container top.

3,991,902
LATCH FOR PAN COVERS

Edward B. Ford, Jr., 6405 Bardu Ave., Springfield, Va. 22152

Filed May 29, 1975, Ser. No. 581,858
Int. Cl.² B65D 45/16
U.S. Cl. 220—324 5 Claims

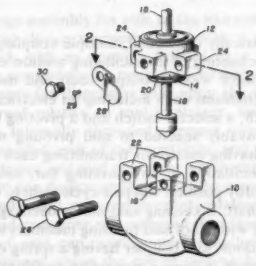


1. Sanitary means for adapting a lid to be latched to a mating pan comprising in combination, a lid having an outer rim around the edge thereof and a central indented portion connected by a tapered ledge to said rim, a mating pan having a rim around the edge thereof, two latch members affixed at opposite rims of said lid, the first member consisting of a generally U-shaped hook part affixed at one end to the upper side of said lid with the other end extending below said lid in a position to hook over the rim of said mating pan, and the second latch member consisting of a retainer part in the form of a longitudinal strap oriented generally parallel to the rim of said lid and affixed to the upper side thereof at each end to retain thereunder between the ends a latch part movable to the rim of said pan, said latch part consisting of a strap member formed with a generally U-shaped hook portion at one end thereof positioned to hook under the rim of said pan when positioned adjacent the rim of said lid and formed with a stop member at the other end to engage the lid assembly at a position permitting the movement of said latch part to place its hook far enough away from the rim of said lid to permit the hook portion to clear the rim of said pan wherein said stop member consists of a downward bend on said strap member of said latch part that conforms in shape with said tapered ledge.

3,991,903
QUICK-DISCONNECT VALVE CLOSURE STRUCTURE

Donald D. Rice, and Herbert H. Walton, both of Marshalltown, Iowa, assignors to Fisher Controls Company, Inc., Marshalltown, Iowa

Filed May 2, 1975, Ser. No. 574,175
Int. Cl.² B65D 45/02
U.S. Cl. 220—327 6 Claims

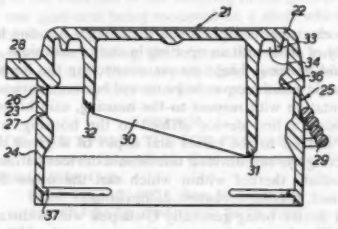


1. A closure structure for a valve or the like, comprising:
a first member having an opening to be closed, said opening having an interior surface,
a second member having a projecting portion extending into said opening, said portion including circumferential resilient sealing means for slidingly engaging said interior surface of said opening in radial compression thereagainst,
one of said members being provided with first and second pairs of lugs extending generally parallel to said projecting portion and said opening,
the other of said members having first and second ears projecting substantially perpendicular to said projecting portion and said opening, said first ear fitting between said first pair of lugs and said second ear fitting between said second pair of lugs, and
a first retaining member extending transversely through said first pair of lugs and over a portion of said first ear, and a second retaining member extending transversely through said second pair of lugs and over a portion of said second ear, whereby each of said ears is retained between a pair of said lugs,
said retaining members being transversely removable to effect disassembly of said first member from said second member.

3,991,904
HINGED CLOSURES

Eugene Edward Davis, Barkingside, and Brian Leslie Miskin, Chislehurst, both of England, assignors to Johnsen & Jorgensen (Plastics) Ltd., London, England

Continuation-in-part of Ser. No. 345,138, March 26, 1973, abandoned. This application June 4, 1975, Ser. No. 583,682
Int. Cl.² B65D 51/04
U.S. Cl. 220—334 3 Claims

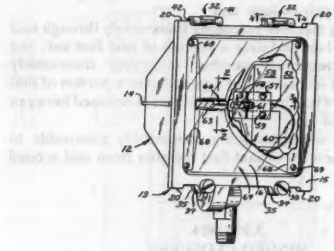


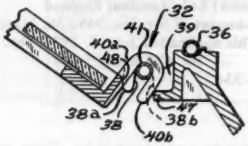
1. A container and closure therefor comprising:
a container having a neck terminating in a rim defining a mouth of circular plan shape, said neck having an external snap over bead disposed below said mouth and an external main band retaining bead below said snap over bead, said neck having an internal bead below said rim which defines a circular sealing surface of smaller diameter than and disposed below said mouth; and
a closure including a cap part, a tear-off strip and an anchor band presenting an internal projection positioned below said main band retaining bead, said cap part having an internal projection positioned below said snap over bead and there being a hinge joining said cap part to said anchor band so that when the tear-off strip is removed the cap part may be swung aside to uncover said neck while remaining attached to the anchor band, said cap part including a thumb tab opposite said hinge and a bung having an external diameter corresponding to that of said sealing surface and being of a length sufficient to be embraced by said sealing surface, said bung being shaped so that the bung is deeper on one side than on the other whereby when viewed from one side the bottom of the bung is formed by an oblique line extending upwardly from the deepest part of the bung to the shallowest part and wherein the shallowest part of the bung is adjacent to said thumb tab by which the cap may be manipulated and the deepest part of the bung is adjacent to the hinge.

3,991,905
HINGED COVER FOR OUTDOOR LAMP CASE

John E. Nicpon, Chicago, Ill., assignor to Appleton Electric Company, Chicago, Ill.

Filed Jan. 27, 1975, Ser. No. 544,319
Int. Cl.² B65D 43/02
U.S. Cl. 220—343 2 Claims





1. In electrical paraphernalia including a housing having a plurality of sides with an opening in one of said sides, a cover over said opening, hinge means connecting the housing and cover to permit the cover to be moved between various angles of orientation with respect to the housing, said hinge means comprising a first device affixed to the housing, a second device affixed to the cover and a pin of a given diameter connecting the two devices, one of said devices defining a slot intermediate thereof within which slot the other device is positioned, the improvement comprising:

each device being generally U-shaped with a distal end, a proximal end and a curved base connecting said ends, the proximal ends of the first device being affixed to the housing and the proximal end of the second device being affixed to the cover, as viewed in cross-section said ends extending substantially farther than the periphery of said pin, said devices being positioned so that when said cover is closed on said housing the U's face in opposite directions whereby the pin is clamped between the bases of the two devices; and

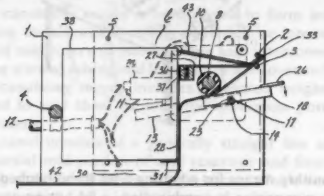
said housing and cover including stop means to prevent the devices from moving sufficiently far away from the pin so that the pin can exit from the opening of the U, said stop means being effective at all angles of orientation of the cover with respect to the housing.

3,991,906
LABEL DISPENSING MACHINE

Allen H. Oglander, 9 Sackston Woods, St. Louis County, Mo. 63141, and Richard E. Shannon, 355 Albert, St. Louis County, Mo. 63031

Filed Sept. 8, 1975, Ser. No. 611,343
Int. Cl.² B65C 9/18
U.S. Cl. 221—73 12 Claims

1. A multiple label dispenser comprising a frame having a zone for receiving a plurality of independent rolls of backing strips having discrete label-forming members removably adhesively secured to the normally upper face thereof, an inclined discharge edge forming member provided on said frame forwardly of said rolls, guide elements for directing said roll backing strips reflexively about said edge, a drive shaft mounted for rotation upon said frame downwardly and rearwardly of said discharge edge, a prime mover operatively engaged to said drive shaft, a normally open control switch operatively connected to said prime mover, a control rod rockably mounted on said frame in spaced apart axially parallel relationship to said drive shaft, a key-forming element rockably disposed upon said control rod in correspondence to each backing roll and having a rearward portion beneath said

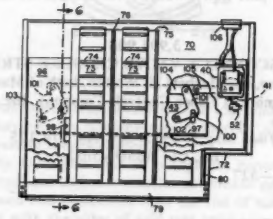


drive shaft and a forward portion forwardly of said control rod, means engaging said key between its ends upon said control rod so that upon rocking of said key the rearward portion thereof will be brought into force-producing contact with said drive shaft for effecting a pulling upon a backing strip led therebetween from the discharge edge, and means mounted on one end of said control rod for engaging said control switch upon rocking of said control rod to close said control switch for actuating said prime mover while the particular key is in rocked condition.

3,991,907
SOLID MERCHANDISE DISPENSING SYSTEM FOR MECHANICAL OR ELECTRICAL CONTROL

Leo Kull, 58 Westover Ave., West Caldwell, N.J. 07006

Filed June 2, 1975, Ser. No. 583,181
Int. Cl.² G07F 11/00
U.S. Cl. 221—84 34 Claims



1. An electrically controlled multiple coupling mechanism for selective coupling of an oscillating motion comprising of an electric motor with an output shaft and more than one coupling mechanisms each including an electrical actuator, a coupler switch, a selector switch and a pivoting member with a coupler movably secured to said pivoting member, said output shaft having means for transmitting each revolution of it to a full oscillation of an operating bar, said mechanism having a standby position where a cycle switch, controlled by said output shaft, is keeping said motor deenergized and said operating bar with all of said pivoting members in one of their extreme positions, said coupler having a spring or gravity bias tending to move it from a nonactive position to a coupled position, said actuator having a gravity or spring biased armature normally holding said coupler in said nonactive position, a closing of said selector switch completing a circuit through said cycle and said coupler switch to energize said actuator for releasing said coupler to said coupled position, said releasing

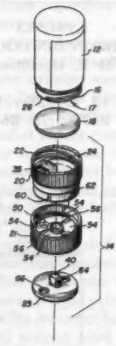
causing a switchover of said coupler switch for interrupting the circuit of said actuator and completing a starting circuit to said motor, the rotation of said output shaft actuating said cycle switch for maintaining a circuit of said motor throughout said cycle, half of said oscillation moving said coupler together with said pivoting member to a position to clear said armature for restoring its standby position, the second half of said oscillation moving said pivoting member together with said coupler back to said standby position letting said armature restore said nonactive position of said coupler and said coupler switch before said cycle switch is stopping said motor, the restored position of said coupler switch preventing a restart of said cycle if said control circuit is broken by said selector switch or by any other circuit interrupter in the circuit of said actuator.

3,991,908

PILL DISPENSER

Michael D. Thomas, Elmhurst, and Francis E. Ryder, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumburg, Ill.

Filed June 27, 1975, Ser. No. 591,176
Int. Cl.² A47F *1/04*
U.S. Cl. 221—154 **11 Claims**



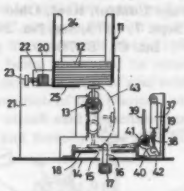
8. A package assembly for pills or the like comprising a pill dispensing cap device in combination with a pill container, having a neck with an opening defined by a rim, said cap device being secured to the open neck of said container and including means for dispensing pills upon the rotation of an element thereof relative to said container, said cap device including an internally threaded segment engaged with an externally threaded neck of said container, and ratchet means on said cap device and said container which engage upon the seating of said cap device on the rim of the open neck of said container, and when engaged prevent rotation of said cap relative to said container in a selected direction required for unscrewing of said cap, said container including a spacer member positioned about the rim of said neck and engaged between said cap member and the rim of said container neck, to thereby prevent engagement of said ratchet means, such that only upon removal of said spacer member can said cap device be seated on said rim to bring said ratchet means into rotation limiting engagement, thereby precluding removal of the cap device.

3,991,909

AUTOMATIC FEEDING DEVICE FOR DELIVERING ARTICLES FROM A MAGAZINE TO A CONVEYOR

Aris Ballestrazzi; Lamberto Tassi, and Gianni Tosarelli, all of Vignola (Modena), Italy, assignors to Situno Holding S.A., Luxemburg

Filed July 30, 1975, Ser. No. 600,472
Claims priority, application Italy, July 31, 1974, 25810/74
Int. Cl.² B65H *3/22*
U.S. Cl. 221—214 **2 Claims**



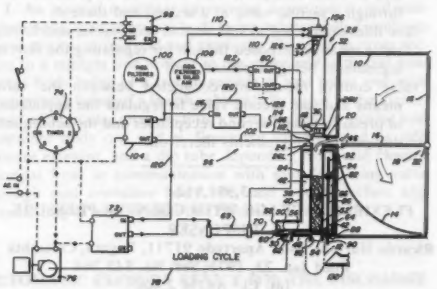
1. An automatic device for the continuous delivery of stacked articles, comprising a continuous conveyor, at least one magazine suitable for containing said articles in a manner whereby they can be removed singly from underneath, at least one grab-arm positioned between said magazine and said conveyor and having a rotary-translatory movement between a raised position for the removal of an article from said magazine and a lowered position for the depositing of the removed article onto a correspondingly aligned tray movable by said conveyor, said grab-arm carrying at its free end a comb with inclined pointed prongs capable of transfixing said articles and pointing in the direction of the lowering of the grab-arm, said at least one grab-arm being mounted on a shaft which has a rotary-translatory movement and said shaft being mounted in rotating manner on sliding blocks translatable on guides in a frame of the machine, the rotary-translatory movement of said shaft being guided by rack-and-pinion gear assemblies.

3,991,910

METHOD AND APPARATUS FOR PACKAGING DOWN

Randal K. Leonard, Broomfield, Colo., assignor to Frostline, Inc., Broomfield, Colo.

Filed Apr. 17, 1975, Ser. No. 569,105
Int. Cl.² B65B *3/04*, *1/04*; B67B *7/00*
U.S. Cl. 222—1 **20 Claims**



14. The method of dispensing measured amounts of down from a bulk supply thereof by means of a perforated tube having an open end and means opposite the open end for opening and closing the same which comprises the steps of: sucking a charge of down from the bulk supply into the open end of the perforated tube while the other end thereof remains closed by establishing a negative pressure outside said tube, shutting off the vacuum and opening up the closed end of the tube preparatory to discharging the charge of down through the latter; emptying the charge of down from the tube through the open end thereof while establishing a positive pressure

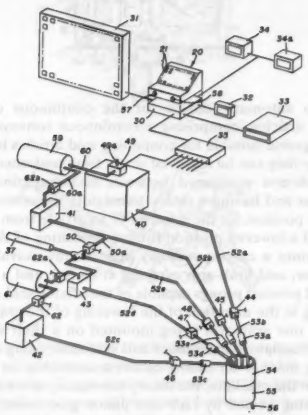
outside said bulk supply effective to keep the remaining supply of down therein, reclosing the open end of the tube to receive another charge of down and shutting off the positive pressure outside the bulk supply.

3,991,911

AUTOMATIC DRINK DISPENSING APPARATUS HAVING PROGRAMMING MEANS

Joseph W. Shannon, Kent; Clarence A. Ripley, Jr., Tallmadge, and John Henry Dailey, Ravenna, all of Ohio, assignors to American Beverage Control, Kent, Ohio

Filed Sept. 7, 1973, Ser. No. 395,125
Int. Cl.[2] B67D 5/06
U.S. Cl. 222—25 **55 Claims**



1. An automatic drink dispensing apparatus, comprising:
operator actuatable selection means for selecting the ingredients or compositions to be dispensed;
a plurality of first receptacles for maintaining a reservoir of ingredients therein under atmospheric pressure;
a plurality of second receptacles in communication with the first receptacles through a first valve at a first end thereof and in communication with a source of pressurization through a second valve at a second end thereof;
flow lines connected to said second receptacles and having valve means interposed therein for regulating the flow of ingredients being dispensed; and
valve control means interconnected between the valve means and said second valve to regulate the application of pressure to said second receptacles and the subsequent dispensing of ingredients therefrom.

3,991,912

FLEXIBLE PACKAGE WITH COUNTER-PRESSURE DISPENSER

Ricardo Hurtado Soto, Apartado 91711, Bogota, Colombia

Filed Jan. 23, 1975, Ser. No. 543,264
Int. Cl.[2] A61M 25/00
U.S. Cl. 222—89 **8 Claims**

1. A package, comprising a sealed, collapsible container of puncturable, flexible material and defining a dispensing location, a portion of said container adjacent said dispensing location being doubly folded to provide two inner folds defining a pocket, said folds being joined at an innermost location; receiving means on said container adjacent said dispensing location; dispenser means detachably securable to said container, and including an insert conduit for insertion between said inner folds of said pocket for penetrating the innermost portion thereof to gain access to said contents of said container, and means on said dispenser for securing said dispenser to said container at said receiving means adjacent said dispensing location; said receiving means on said container providing stiffening means including a stiffened tab portion of said container defining an aperture adjacent said pocket for stiffening said container adjacent said pocket to retain said folded shape even when the contents are subjected to pressure; and means projecting from the body of said dispenser for

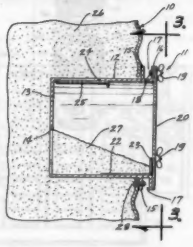
extending through and coupling with said aperture of said tab portion of said container when said dispenser means is inserted in assembled relation with said container; whereby back pressure during insertion of said dispenser means and hand pressure exerted on said container after insertion will be transmitted to the inner folds of said pocket to force the same together in progressive sealing engagement with said insert conduit to prevent seepage of the contents.

3,991,913

GRAIN BIN DOOR

Vincent B. Steffen, 321 E. Hamilton, New Hampton, Iowa 50659

Filed Mar. 13, 1975, Ser. No. 558,066
Int. Cl.[2] B67D 5/38; B65G 65/40
U.S. Cl. 222—156 **8 Claims**

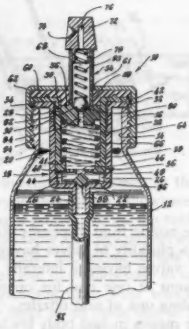


1. A grain viewing and sampling device in combination with a grain bin having sidewalls, comprising:
a container having a rear wall and a front wall, and laterally extending walls, extending from the rear wall to the front wall, said rear wall having an opening in a lower portion thereof;
means for connecting a front portion of said container to a grain bin sidewall whereby said container extends into said grain bin;
means connected to said container for selectively removing said front wall;
extension means connected to a front-bottom portion of said container, for extending forwardly the effective bottom of said container whereby said extension means serves as a spout for allowing grain to pour into a grain sampling device;
and wherein a grain port is disposed in a top portion of said laterally extending walls of the container and said device includes means for opening and closing said grain port.

3,991,914
EASILY ASSEMBLED, LEAKPROOF LIQUID DISPENSING PUMP

Paul M. Kotuby, Naugatuck; Edward A. Pettersen, Waterbury, and Alvydas Velicka, Watertown, all of Conn., assignors to The Risdon Manufacturing Company, Naugatuck, Conn.

Filed May 29, 1975, Ser. No. 581,906
Int. Cl.² G01F *11/36*
U.S. Cl. 222—321 **5 Claims**



1. An easily assembled, self-venting, leakproof liquid dispensing pump for dispensing liquid from a container while preventing leakage therefrom regardless of container attitude, said dispensing pump comprising:

hollow outer cylinder means having an open end and first vent conduit means passing through the wall of said cylinder means, said outer cylinder means being closed at its other end and having first axial inlet means thereat,

hollow inner cylinder means likewise having an open end and second vent conduit means passing through the wall of said inner cylinder means, said inner cylinder means being closed at its other end and having thereat second axial inlet means including a main axial inlet and a plurality of secondary inlets disposed about said main axial inlet;

said inner cylinder means being nested in said outer cylinder means to form a lower valving chamber and a pumping chamber, and to define an annular passage between the side walls of said outer and inner cylinder means, said first and second vent conduit means communicating with said annular passage, said second vent conduit means also communicating with said pumping chamber, and said outer cylinder means being formed with at least three axially extending ribs on its inner wall in the region of said lower valving chamber;

a plunger, mounted in said pumping chamber for reciprocal movement out of and back to a "home" position to which it is normally biased, said plunger having a piston and a hollow stem and associated piston port defining a flow passage communicating between atmosphere and said pumping chamber below said piston, said piston being adapted to cover and close said second vent means when said plunger is in said "home" position, and vent groove means along the exterior of said hollow stem communicating between atmosphere and said pumping chamber above said piston when said plunger is depressed;

nozzle means mounted on the end of said plunger stem having discharge orifice means communicating with said flow passage of said plunger;

resilient means for urging said plunger to said "home" position;

lower check valve means for preventing return flow through said outer cylinder inlet means, said lower check valve means comprising a disc, centered in said lower valving chamber for free valving movement by said ribs, and opposing axially located conical projections on opposite disc faces, one of said projections cooperating with said outer cylinder inlet means to form a check valve seat and valve member, the other of said projections cooperating with said inner cylinder main inlet to limit movement of said check valve means toward said inner cylinder to prevent said lower check valve means from sealing against said secondary inlets;

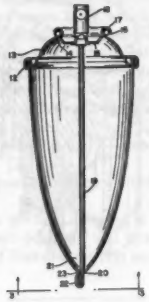
upper check valve means, disposed in said plunger stem to prevent return flow therethrough, comprising a ball valve, a valve seat formed about said piston port and spring means mounted in said flow passage for urging said ball valve into closed engagement with said valve seat; and

means for closing the open ends of said cylinder means said closing means being apertured to receive said plunger stem for projection outwardly of said nested cylinders and to allow reciprocation of said plunger, said closing means also serving to attach said dispenser pump in the mouth of a container and thereby close such container.

3,991,915
AEROSOL CONTAINER

James W. Kinnavy, DuPage, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Continuation of Ser. No. 810,572, March 26, 1969, abandoned. This application Mar. 18, 1971, Ser. No. 125,831
Int. Cl.² B65D *83/14*
U.S. Cl. 222—394 **4 Claims**



1. An aerosol container comprising a one-piece rigid container body, said container body being substantially circular in cross section at one end and gradually changing in cross section to a straight line bottom at the other end with said container body being of a trough section at said other end, said bottom wall being of a length substantially equal to the diameter of said circular cross section, a closure element closing said container body one end, a dispensing valve carried by said closure element, and a dip tube depending from said closure element from in communication with said dispensing valve through said container body into said trough section and terminating at said straight line bottom.

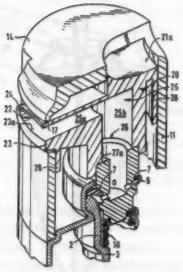
3,991,916
AUTOMATIC CLOSURE DEVICE FOR THE DISCHARGE OF A FOAM PRODUCT FROM A PRESSURIZED CONTAINER

Franco Del Bon, 141, Feldstrasse, Ch-4663 Aarburg, Switzerland

Filed Apr. 11, 1975, Ser. No. 567,086
Claims priority, application Switzerland, July 1, 1974, 9087/74; July 20, 1974, 10245/74; Aug. 30, 1974, 11809/74
Int. Cl.² B65D *25/40*, *83/14*
U.S. Cl. 222—402.13 **18 Claims**

1. An automatic closure device for use in combination with a pressurized container which has a liquid or pasty filling

dischargeable as a form, as well as a propellant, and comprises a valve means spring-biassed into the closed position; which closure device comprises an actuator head having a discharge orifice, a single discharge duct in the actuator head which duct connects the discharge orifice with an entry port, remote from the orifice, in the actuator head and serving for connecting the latter to an outlet opening of the container controlled by the aforesaid valve means, the discharge duct and orifice being surrounded by an integral wall consisting, at the discharge orifice and the wall portion adjacent the latter, of two wall zones the contact edges of which at the discharge orifice are of equal length and abut each other in closed position while, in open position, these contact edges merge with each other under an acute angle, one of these wall zones being elastically flexible and the other rigid; and a beak-shaped closing member having a lip portion and being associated with the actuator head in a manner such that the free end of the lip portion of the closing member rests against the elastically flexible wall zone from the outside of the latter at the discharge orifice, thus pressing the flexible wall zone in the closed position hermetically sealingly against the rigid wall zone; said discharge duct in said actuator head being provided with a bend or knee zone; said flexible wall extending from the discharge orifice rearward at most to the beginning of the knee zone of



the duct; and said flexible wall zone being, in the closure position effected by pressure of the free end of the lip portion of the closing member on the outside of the flexible wall zone, inclined relative to the central plane extending through the discharge duct between the flexible and rigid wall zones toward the discharge orifice, at a small angle such that when the spring biassed valve means of the pressurized container suddenly opens, the flexible wall zone will withstand the resulting sudden pressure buildup in the interior of the discharge duct; a cap, mounted on the pressurized container and surrounding said actuator head, having an opening therein to permit access to, and manipulation of said actuator head; wherein the portion of the actuator head which contains the discharge orifice is displaceable within said cap along the central axis of the pressurized container which axis extends through the valve thereof; and a spring for effecting the return movement of the actuator head relative to the cap, said spring being adapted for biassing the valve of the pressurized container into its closing position, and said spring acting in such a manner on the actuator head in the direction of the longitudinal axis of the region of the discharge duct extending from the knee zone in the latter to the entry port that the rigid wall zone and the flexible wall zone are pressed against one another and against the free end of the lip portion of said closing member, thereby hermetically sealing the discharge orifice.

3,991,917

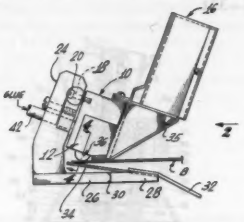
FLEXIBLE STEM VALVES SELECTIVELY ACTUABLE BY A COMMON OPERATOR

Lenard E. Moen, 7914 Michigan Ave., Whittier, Calif. 90602

Filed Dec. 5, 1975, Ser. No. 638,068

Int. Cl.[2] B67D *3/00*; F16K *31/00*; B05C *1/00*

U.S. Cl. 222—486 **18 Claims**



8. A multiple nozzle fluid dispenser comprising:

a body with a plurality of valves having outlet nozzles,

each of said valves having a laterally flexible stem with a valve element at one end for opening and closing the corresponding one of said nozzles,

and operator means in said body for laterally flexing all of said stems in common.

3,991,918

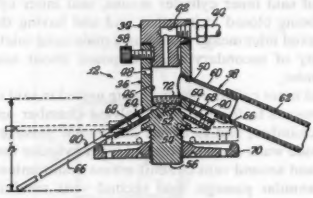
ABRASIVE SLURRY REGULATOR ASSEMBLY

David M. McNamara, Arlington Heights, and Stephen A. Boettcher, Deerfield, both of Ill., assignors to Speedfam Corporation, Des Plaines, Ill.

Filed Nov. 4, 1974, Ser. No. 520,608

Int. Cl.[2] B67D *3/00*

U.S. Cl. 222—527 **1 Claim**



1. A regulator assembly for controlling the flow of an abrasive slurry comprising

a support,

body means secured to said support and defining a cavity containing a pool of abrasive slurry,

overflow means secured to the side of said body means for establishing the upper level of a pool of abrasive slurry in said cavity,

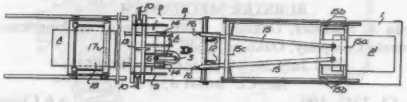
a plurality of identical circumferentially spaced apart flow-restrictive conduit means secured at one end in said body means, said conduit means having an inner tube section secured in said body means and communicating with said cavity at the lower end of the pool of abrasive slurry and having an outer tube section flexibly connected to said inner tube section from which abrasive slurry is discharged, and

a selectably adjustable rotatable member threaded on the lower end of said body means and having engagement with said outer tube section of said plurality of conduit means to selectively adjust the vertical distance between the plane of the upper level of the pool of abrasive slurry and the plane of the outer tube section of said conduit means.

3,991,919
TURNING MACHINES FOR PILLOW CASES AND SIMILAR ARTICLES

John Dennis Hogan, 18 Whitegates Road, Cheadle, Chester, England

Filed Oct. 3, 1975, Ser. No. 619,181
Claims priority, application United Kingdom, Oct. 9, 1974, 43715/74
Int. Cl.² A41H 43/00
U.S. Cl. 223—39 6 Claims

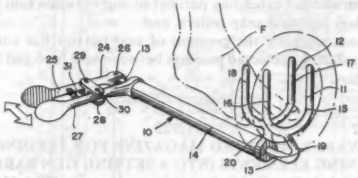


1. A machine for everting pillowcases or the like comprising: a table; a conveyor for feeding pillowcases to said table; means for positioning a pillowcase on the table for eversion; gripping means on said table for engaging an upper layer of an open end of a pillowcase; anchoring means for clamping a lower layer of an open end of a pillowcase to said table; a pair of stretching and spreading arms over which said gripping means lifts an upper layer of an open end of a pillowcase as a lower layer thereof is released from said table; eversion means for moving the trailing end of a pillowcase through an open end of the same pillowcase between said stretching and spreading arms to evert a pillowcase; and nipper means for gripping a closed, everted end of a pillowcase and withdrawing it from the stretching and spreading arms.

3,991,920
DEVICE FOR APPLYING STOCKING

Thomas D. Hall, 821 Hudson Road, Glenview, Ill. 60025

Filed Sept. 29, 1975, Ser. No. 617,869
Int. Cl.² A47J 51/06
U.S. Cl. 223—111 1 Claim

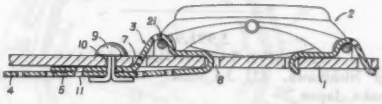


1. An apparatus for applying a stocking to a foot comprising first and second generally arcuately shaped clamping members through which the foot can be inserted, an elongated support rod having upper and lower ends, the lower end being connected to the first clamping member, an elongated support tube having upper and lower ends telescopingly receiving the support rod, the lower end of the support tube being connected to the second clamping member whereby the clamping members can be moved toward or away from each other by telescoping movement of the support rod within the support tube, each of the arcuate clamping members extending in a plane generally transverse to the support rod and support tube, the first clamping member including a generally U-shaped connecting portion connected to the first clamping member and the second clamping member including a connecting portion connected to the support tube, the U-shaped connecting portion providing a space between the U-shaped connecting portion and the other connecting portion for accommodating a rolled-up stocking, the first clamping member having a generally convex smooth surface facing the second clamping member and the second clamping member having a generally concave surface facing the first clamping member and including friction-providing material for providing a frictional force on a stocking clamped between the two clamping members, a pair of pivotally connected handle levers secured to the upper ends of the support rod and support tube, pivotal movement of the handle levers causing telescoping movement of the support rod within the support tube whereby the frictional force on the stocking can be varied and controlled.

3,991,921
STRAP ASSEMBLY

Hermann Hirsch, Karnten, Austria, assignor to Hermann Hirsch Leder- und Kunststoffwarenfabrik, Karnten, Austria

Filed Sept. 2, 1975, Ser. No. 609,818
Claims priority, application Austria, Apr. 23, 1975, 3127/75
Int. Cl.² A44C 5/14
U.S. Cl. 224—4 D 4 Claims



1. A strap assembly adapted to be connected to at least one fixing bar having a width between a predetermined lower limit and a predetermined upper limit, which comprises

a carrying strap formed with transverse slot means,

a fixing strap having first and second end portions and an intermediate portion and extending through said slot means and adapted to extend around said fixing bar, said first and second end portions being adapted to be secured to said carrying strap,

said first end portion having a width equal to said lower limit,

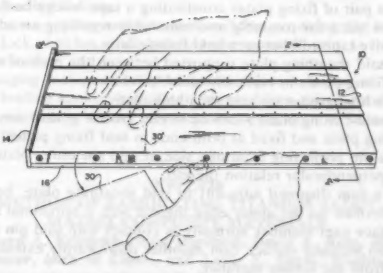
said second end portion having a width equal to said upper limit,

said intermediate portion merging in width into said first and second end portions and gradually increasing in width from said first end portion to said second end portion.

3,991,922
ABRASIVE SHEET MEASURING AND CUTTING BOARD

Mervin B. Martin, Box 408 - R.D. 4, Coatesville, Pa. 19320

Filed Sept. 18, 1975, Ser. No. 614,767
Int. Cl.² B26F 3/02
U.S. Cl. 225—17 1 Claim



1. Portable abrasive sheet measuring and cutting device comprising:

A. substantially rectangular, elongate base member havng side ends and forward and rearward ends, said base member defining plural grooves transversely of the side ends

thereof, each said groove being set parallel to the other, discrete distances in depth, relative to the forward and rearward ends of the base member; said grooves in vertical cross-section defining a declining front wall from the forward-most portion thereof to the bottom and a substantially vertically extending rearward wall the topmost of which is coplanar with the base member top defining a first abutment means for an abrasive sheet;

B. a serrated, abrasive sheet cutter, contiguous the forward edge of the base member, said cutter projecting above the plane of the base member and being parallel to the said respective grooves thereof;

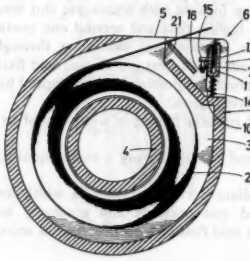
C. a second abrasive sheet abutment on one side end and projecting above the plane of the base member, said second abutment being disposed normal to said first abutment means and said cutter and being coextensive with the forward and rearward ends thereof, whereby to confine with said grooves an abrasive worksheet on two sides thereof, a measured distance in depth from the cutter.

3,991,923

ADHESIVE TAPE HOLDER MEANS

Kenji Nishikawa, 42, 3-Chome, Arakawa, Higashiosaka, Osaka, Japan

Filed Mar. 4, 1975, Ser. No. 555,234
Int. Cl.² B26F *3/02*
U.S. Cl. 225—20 **1 Claim**



1. An adhesive tape holder means comprising a straight line cutting blade for cutting a length of adhesive tape, a sheathing plate movably mounted with respect to said blade, a cam means adapted to normally keep said sheathing plate in a position wherein said blade is sheathed through the full length thereof, said cam means being movable to move at least said sheathing plate with respect to said blade to expose said blade,

a. a pair of fixing plates constituting a tape holder body,

b. a space for rotatably and removably receiving an adhesive tape roll between said fixing plates,

c. said sheathing plate supported between the ends of said fixing plates in vertically slidable relation,

d. a long groove on said sheathing plate,

e. said cutting blade received in said groove of said sheathing plate and fixed at both ends to said fixing plates,

f. a pin projecting from one side of said sheathing plate in perpendicular relation thereto,

g. a cam disposed adjacent to said sheathing plate, being formed on the upper edge thereof with a horizontal surface cam member normally in contact with said pin and an inclined surface cam member downwardly extending from the former member,

h. holes through said fixing plates to slidably support said cam between said plates,

i. a constrictive spring held between one of said fixing plates and said cam so as to normally press said cam against the other fixing plate,

j. a tensile spring held between the lower portion of said tape holder means and said cam so as to normally pull down said cam,

k. a foremost end of said cam slidably supported in one of said holes through said fixing plate and normally projected outward from said hole, and

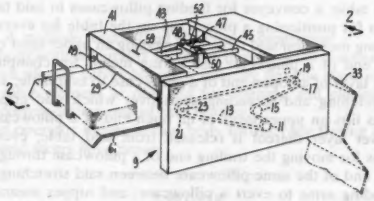
l. a guide plate disposed between said cam and a tape roll received in said space so as to guide a tape portion being drawn out.

3,991,924

BURSTER MECHANISM

Marlin A. Schueler, Oakland, Calif., assignor to American/-Durein Company, Oakland, Calif.

Filed July 30, 1975, Ser. No. 596,861
Int. Cl.² B65H *35/10*
U.S. Cl. 225—100 **6 Claims**



1. A burster mechanism comprising in combination:

a. a pair of feed rollers located adjacent to the entrance end of a burster machine,

b. a pair of snap rollers located adjacent to the discharge end of said burster machine,

c. said feed rollers and said snap rollers being mounted for rotation on fixed, spaced centers,

d. driving means for said rollers whereby said snap rollers are driven at a slightly higher rate of speed than said feed rollers,

e. a burster bar extending parallel to and between said feed rollers and said snap rollers, and

f. means whereby the position of said burster bar can be adjusted to a selected position between said feed and snap rollers.

3,991,925

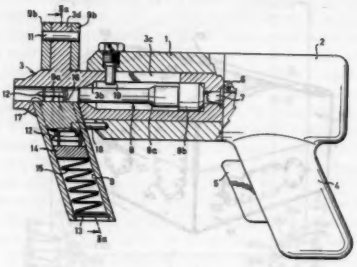
MOVABLY MOUNTED MAGAZINE FOR FEEDING FASTENING ELEMENTS INTO A SETTING GUN BARREL

Franz Büchel, Rugell, Liechtenstein, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed July 9, 1975, Ser. No. 594,340
Claims priority, application Germany, July 12, 1974, 2433642
Int. Cl.² B25C *1/14*
U.S. Cl. 227—10 **13 Claims**

1. A setting gun using an explosive charge for driving fastening elements into a hard receiving material comprising a housing having an axially extending bore therethrough, a barrel axially displaceably mounted in the bore of said housing and said barrel having an axially extending bore therethrough in parallel relation with the housing bore, the surface of the bore in said barrel affording a guide surface for fastening elements as the elements are driven from the bore, said bore in said barrel having a forward end from which fastening elements are driven into the receiving material and a trailing end, an inlet opening in the lateral surface of said barrel for inserting a fastening element into said barrel bore, wherein the improvement comprises a magazine having a passageway therethrough arranged to contain a plurality of fastening elements in position to be inserted individually out of the magazine and into

said barrel bore, said magazine having an outlet opening from the passageway extending in the axial direction of the barrel bore through which the fastening elements can be passed into the barrel bore, said magazine being movably mounted on said barrel with the passageway therein extending transversely of and outwardly from the axis of said barrel, said magazine



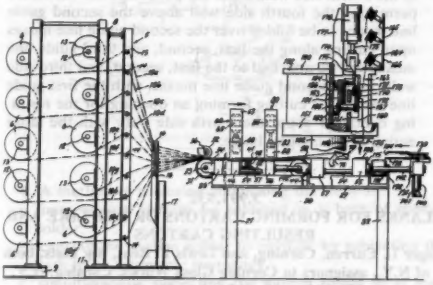
being movably mounted for movement around said barrel between a first position with the outlet opening in said magazine in register with the inlet opening into said barrel bore and a second position with the outlet opening displaced from the inlet opening and with said magazine blocking the passage of the fastening elements into the barrel bore.

3,991,926

SWATCH CUTTING AND BINDING APPARATUS AND METHOD

William M. Marks, Irvington, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed July 23, 1975, Ser. No. 598,489
Int. Cl.[2] B27F *7/08*
U.S. Cl. 227—21 **12 Claims**



1. Apparatus for fabricating pads of swatches representative of serveral distinct webs of flexible fabric supplied thereto simultaneously in superposed relationship as a combined web of several plies, comprising

a. cutting press means including an anvil for supporting the leading edge portion of said combined web in position for cutting thereof by said press means, and a press head cyclically reciprocable to and from said anvil and mounting thereon cutting knives arranged to cut off the leading edge portion of said combined web during a cyclic reciprocation thereof,

b. in-feed means for intermittently advancing said combined web onto said anvil includingg a preciprocable carriage disposed to support the leading edge portion of said combined web, said carriage including means for clamping the leading edge portion of said combined web to said carriage during the web advance movement thereof, and

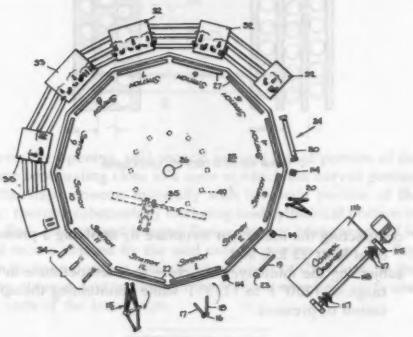
c. means for gripping said leading edge portion after advance thereof by said clamping means, said gripping means including carriage mounted fingers for holding said leading edge portion on said anvil during cutting thereof by said knives and withdrawing said portion from said anvil after being cut off from said web by said knives.

3,991,927

AUTOMATIC FRAME BRAZING MACHINE

Carl A. Napor, Glen Ridge, and Anthony A. Milana, Toms River, both of N.J., assignors to Kahle Engineering Co., Union City, N.J.

Filed Mar. 28, 1975, Ser. No. 563,082
Int. Cl.[2] B23K *37/04*
U.S. Cl. 228—41 **21 Claims**



1. An automatic frame fastening machine comprising the combination of:

a turret;

means for mounting said turret for rotation about an axis;

a plurality of frame fastening fixtures mounted around the edge of said turret;

a plurality of work stations positioned around said turret;

means for providing a stepped rotation of said turret to move the said fastening fixtures to said stations;

clamps for engaging a plurality of frame members on said fastening fixtures;

switch means on said fastening fixtures for operating said clamps;

fastening means including heating means positioned at a plurality of said work stations for fastening frame members together;

control and timing means for operating said turret, clamps, and fastening means;

said work stations including a plurality of adjacent frame member loading stations with an interlock switch at each loading station;

means coupling said interlock switches requiring the interlock switches at all stations to be activated prior to turret rotation; and

gauging means movably mounted adjacent to one of said loading stations including a motor driven gauging rod for positioning frame members clamped onto a fastening fixture.

3,991,928

METHOD OF FABRICATING TITANIUM ALLOY MATRIX COMPOSITE MATERIALS

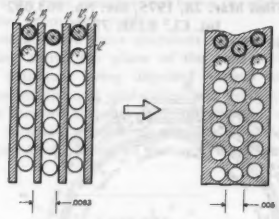
Leonard A. Friedrich, West Hartford; David A. Rutz, Manchester, both of Conn., and Louis E. Dardi, Muskegon, Mich., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 22, 1974, Ser. No. 499,641
Int. Cl.[2] B23K *19/00*
U.S. Cl. 228—190 **7 Claims**

1. A method of producing a composite metallic material comprising the steps of:

arranging a plurality of silicon coated boron fibers in evenly spaced relationship on a first surface of a beta-titanium alloy foil;

stacking a plurality of foil-fiber arrangements to provide a multilayer structure consisting of alternate layers of foil and fibers having a fiber volume fraction of 45–65 percent;



VACUUM HOT PRESS FIBER-FOIL CONSOLIDATION

compacting the multilayer structure by applying a pressure of at least 22 ksi; and

subjecting the multilayer structure to a temperature in the range of 1250° F to 1275° F while maintaining the application of pressure.

3,991,929

COATING AND BONDING OF METALS

Frank Smith, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 10, 1973, Ser. No. 395,595

Claims priority, application United Kingdom, Sept. 22, 1972, 43897/72

Int. Cl.² B23K *31/02, 35/24*

U.S. Cl. 228—208 **19 Claims**

1. A method of making a composite by bonding a tube-like sheath of titanium, zirconium or tantalum (or an alloy of one of the said metals) to a copper or aluminum article which comprises the steps of

i. coating the inner surface of the sheath of titanium, zirconium or tantalum (or an alloy of one of the said metals) with a tinning metal or alloy by heating the said sheath to a temperature in the range 350° C to 450° C while the inner surface is covered with the tinning metal or alloy in the molten state and moving an ultrasonically excited probe over substantially the whole of the outer surface of the sheath, said probe being in contact with said outer surface and

ii. surrounding the article with the coated sheath thus obtained and soldering together the sheath and the article.

3,991,930

METHOD FOR PRODUCING A MULTI-LAYER METAL STRIP AND METAL STRIP PRODUCED ACCORDING TO SAID METHOD

Sven Ekerot, Fagersta, Sweden, assignor to Fagersta AB, Fagersta, Sweden

Filed Sept. 22, 1975, Ser. No. 615,247

Int. Cl.² B23K *15/00, 35/22*

U.S. Cl. 228—263 **3 Claims**

1. A method for producing a multi-layer metal strip wherein at least one strip of a high-speed steel alloy which in addition to iron and normal impurities contains 0.60–1.30 % C, 3.0–5.0 % Cr, 1.0–10 % Mo, 1.0–20 % W, up to 12 % Co and 0.5–4.0 % V is cemented onto a carrier strip by welding, characterized in that 0.005–0.5 % Ce is added to the high-speed steel alloy.

3,991,931

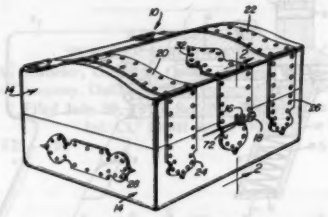
DECORATIVE CONTAINER

Marjorie L. McMaster, Van Tassell, Wyo. 82242

Filed Apr. 6, 1976, Ser. No. 674,662

Int. Cl.² B65D *5/02*

U.S. Cl. 229—8 **3 Claims**



1. In a carton of substantially rectangular parallelepiped configuration having four side walls, a bottom wall, and a top portion, means for converting the carton to a decorative container, comprising, in combination:

a. a first guide line means for cutting provided on three side walls of the carton and disposed in a plane substantially parallel to the bottom wall of the carton;

b. a second guide line means for cutting provided on the same three side walls of the carton as the first guide line means for cutting and spaced from the first guide line means toward the top portion of the carton; and

c. a third guide line means for cutting provided on two parallel side walls of the carton perpendicular to the fourth side wall of the carton and extending from the second guide line means for cutting substantially parallel to the fourth side wall to the top portion of the carton for permitting the fourth side wall above the second guide line means to be folded over the second guide line means upon cutting along the first, second, and third guide line means and be attached to the first, second, and third side walls at the second guide line means, with the first guide line means for cutting forming an opening for the resulting container about the fourth side wall, with the latter acting as an integral hinge.

3,991,932

BLANKS FOR FORMING CARTONS OR THE LIKE AND RESULTING CARTONS

Roger L. Curren, Corning, and Lewis F. Reas, Big Flats, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 12, 1976, Ser. No. 666,340

Int. Cl.² B65D *5/26*

U.S. Cl. 229—35 **8 Claims**

I. A blank of a relatively thick material foldable to form a carton or the like, such blank comprising:

A. a rectangular bottom panel;

B. side panels hinged to the side edges of said bottom panel;

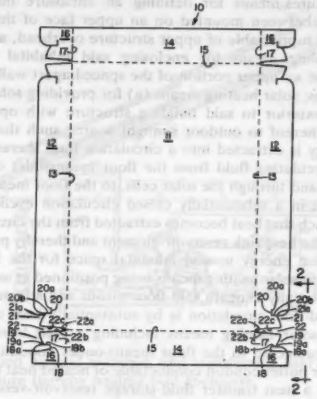
C. end panels hinged to the end edges of said bottom panel;

D. a locking tab hinged to each end of each said end panel, each such locking tab embodying a slit and notch arrangement including;

I. a right angle slit having a first leg extending from approximately the center of the respective locking tab parallel with the end of the end panel to which such locking tab is hinged and toward an outer edge of such tab, and a second leg extending from said center towards another outer edge of said tab; and

II. in said other outer edge of said tab, a generally V-shaped notch whose apex connects with the end of said second leg of said slit; and,

E. each end of each of said side panels of said blank embodying a slit and notch arrangement which is complementary to and is a mirror image of such arrangement in the respectively adjacent locking tab.

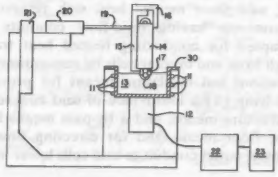


3,991,933

METHODS AND APPARATUS FOR SOLDERING

John N. Antonevich, Jamestown, N.Y., assignor to Blackstone Corporation, Jamestown, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,190
Int. Cl.² B23K 1/06
U.S. Cl. 228—110 8 Claims



1. A method of soldering comprising the steps of:
a. immersing a part to be soldered in a bath of molten solder,
b. causing the molten solder to cavitate by subjecting the bath to an ultrasonic frequency,
c. simultaneously subjecting the molten solder to at least one frequency, other than the frequency causing cavitation, which is resonant with the part to induce vibrations in said part, and
d. removing said part from the molten solder.

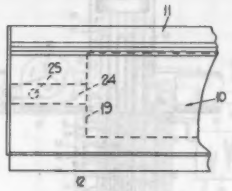
3,991,934

LETTER PLATES

Richard David Hamblin, Birmingham, England, assignor to Archibald Kenrick and Sons Limited, England

Filed Apr. 17, 1975, Ser. No. 568,911
Int. Cl.² A47H 33/00
U.S. Cl. 232—46 2 Claims

1. A letter plate comprising an extruded flap and a planar extruded frame having an opening formed therein, said frame being formed, at one edge thereof, with a first integral flange portion extending normally from the plane of said frame and a second integral flange portion extending normally from said first integral flange portion, internal surfaces of said first and second integral flange portions defining a part cylindrical recess, said flap being formed, at one edge thereof, with an integral cylindrical portion, which is connected to a main portion of the flap by a curved portion defining a recess, the part cylindrical recess in the frame defined by said first and second integral flange portions being shaped to receive said cylindrical portion of the flap and hingedly retain it for pivotal movement between an open position in which the opening of the frame is uncovered and a closed position in which said flap



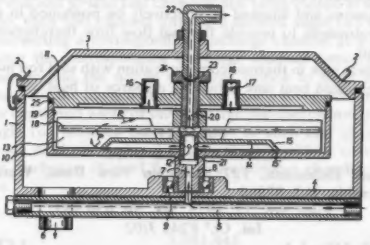
covers the opening, said second integral flange portion of the frame terminating close to a zone at which the curved portion of the flap connects integrally with the main portion of the flap, thereby substantially enclosing said cylindrical portion of the flap, said second integral flange portion being received in said recess defined by the said curved portion when the flap is in its open position, and the extremities of the frame, in the same plane as said opening in the frame, being bent up to seal the ends of the letter plate.

3,991,935

OIL CLEANER

Erik Henning, Enskede, Sweden, assignor to Miljator AB, Stockholm, Sweden

Filed Feb. 4, 1975, Ser. No. 547,041
Claims priority, application Sweden, Feb. 8, 1974, 7401739
Int. Cl.² B04B 9/00
U.S. Cl. 233—23 R 5 Claims

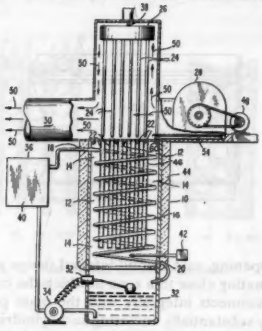


1. A centrifugal oil cleaner comprising a housing having a bottom, side walls and cap detachably closing said side walls, means providing a passage in said housing bottom for oil to be cleaned, a hollow rotor having a bottom, sides, top and an axle rotatably mounted on said housing bottom, a guiding disc being located in said rotor and having a downwardly directed peripheral conical portion, said disc being spaced from said rotor bottom providing an oil space, said disc conical portion being spaced a narrow distance from said rotor bottom providing a relatively narrow gap for the outward passage of the oil, said rotor axle having a bore communicating with said oil passage and outlet openings communicating with said bore and said space between said disc and said rotor bottom, outlet nozzles being mounted in said rotor top having outlet openings communicating with the interior of said housing with the direction of said outlet openings being perpendicular to the radius from the center of said cap to the center of the respective nozzle and said housing bottom having an outlet opening.

3,991,936
HEAT TRANSFER SYSTEM

Harold Switzgable, P.O. Box 171, Monmouth Junction, N.J. 08852

Filed Nov. 26, 1975, Ser. No. 635,560
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 19 Claims

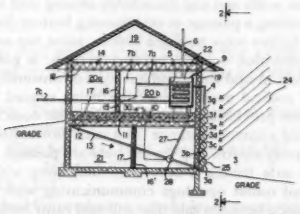


1. A heat transfer system comprising:
a. a tank defining a chamber therein;
b. heat storage material located within said chamber;
c. fluid conduit means extending inward through a wall of said tank into said chamber and extending outward through a wall of said tank, said conduit means defining an inlet and outlet, said inlet being connected to receive heated fluid material to flow therethrough, the wall of said conduit means contacting said heat storage material to supply heat thereto;
d. a plurality of hollow protrusions of a wall of said tank into said chamber, the external surface of said protrusions being insulated from fluid flow communication with said chamber;
e. a plurality of rod members positioned adjacent said protrusions and adapted to selectively be positoned in said protrusions to provide thermal flow flow therebetween; and
f. a heat sink in thermal communication with said rod members, said heat sink providing a source of heat.

3,991,937
SOLAR-HEATED UNIT

Volkmar Heilemann, 127 Mountain View Road, Warren Township, N.J. 07060

Filed Nov. 12, 1975, Ser. No. 630,963
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 1 Claim



1. A solar heated dwelling unit comprising in combination: a building structure (1) having floor means (a) for circulating fluid therethrough and (b) for providing a heat-sink reservoir, and the floor means comprising a heat sink reservoir element, a floor means-inlet conduit connected to the heat-sink reservoir element and a floor means-outlet conduit connected to the heat-sink reservoir element, and (2) having spaced-apart wall structures-means for defining an enclosure inhabital space therebetween mounted on an upper face of the floor means and supportable of upper structure overhead, and (3) having ceiling means for enclosing said inhabital space, mounted on an upper portion of the spaced-apart wall structures-means; solar heating means (a) for providing solar cells mounted exterior to said building structure with operative exposure thereof to outdoor sunlight source such that solar heat energy is extracted into a circulation fluid thereof, and (b) for circulating fluid from the floor means-inlet conduit serially to and through the solar cells, to the floor means-outlet conduit in a substantially closed circulation cyclic flow, adapted such that heat becomes extracted from the circulating fluid into the heat sink reservoir-element and thereby provides thermal heat energy to said inhabital space for the heating thereof, said solar heating means being positioned at an elevation substantially beneath said floor means and adapted such that closed-flow circulation is by substantially heat convection, the solar heating means including a cells lower inlet conduit connected to the floor means-outlet conduit, and a cells upper outlet-conduit conductable of heated heat transfer fluid, and a heat transfer fluid-storage reservoir-vessel containable of liquid heat transfer fluid, as a part of the closed-flow circulation, the heat transfer fluid-storage reservoir-vessel being positioned substantially at a higher elevation than said floor means and having a reservoir-vessel inlet conduit for receipt of hot liquid heat transfer fluid from and being connected to said cells upper outlet conduit, and the heat transfer fluid-storage reservoir-vessel having a reservoir vessel outlet conduit for passage of hot liquid heat transfer fluid to and being connected to the floor means-inlet conduit, said reservoir-vessel outlet conduit being located at a lower portion of said heat transfer fluid-storage reservoir-vessel, and said heat transfer fluid-storage reservoir-vessel having said reservoir-vessel inlet conduit located at an upper portion of said reservoir vessel; said floor means' heat sink reservoir element including concrete having fluid-flow conduits embedded therein, adapted for conducting heated heat transfer fluid therethrough from and to solar cells by convection flow of said heat convection; and insulation means for preventing heat energy loss from (1) a lower face of said concrete, and (2) said wall structure-means; and a by-pass means for flow by-passing said floor means and for directing flow from said reservoir-vessel outlet conduit to said cells lower inlet conduit.

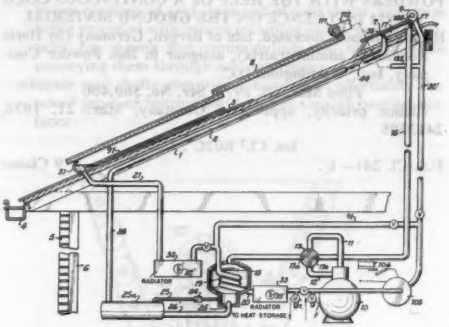
3,991,938
COMBINATION HEAT PUMP AND LOW TEMPERATURE SOLAR HEAT ABSORBER

Harry Borders Ramey, Rte. 5, Box 272, Berea, Ky. 40403

Filed Nov. 4, 1974, Ser. No. 520,727
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 7 Claims

1. The method of heating an enclosure comprising: operating a heat pump to cool a plate exposed to the ambient atmosphere, spraying a liquid upon said plate, continuing the operation of the heat pump until a sheet of solid material is formed

thereon, removing the solid material, exposing said material to radiant heat to melt it, recovering in said heat pump the heat



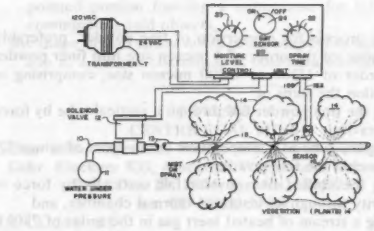
absrobed by said material, and transferring said heat to the enclosure thereby heating said enclosure.

3,991,939

SYSTEM FOR SPRAYING AND COOLING VEGETATION

William Richard Maclay, 16300 Lavender Lane, Los Gatos, Calif. 95030

Filed July 16, 1975, Ser. No. 596,423
Int. Cl.² B05B 12/02; A01G 27/00
U.S. Cl. 239—63 5 Claims



1. An automated system for spraying and cooling vegetation, said system comprising:

means for conveying a cooling spray of water vapor to the vegetation,

valve means operative to release said cooling spray in response to an energizing signal, and

control circuit means for regulating said valve means, comprising in combination,

a moisture sensor including a chemically inert body having a porous outer surface for absorbing moisture to the interior thereof and having a moisture absorption and evaporation rate approximating that of the vegetation,

a pair of precious metal electrodes fixed in spaced relationship within the interior of said chemically inert body,

a detection circuit for detecting the electrical conductivity between said electrodes and for supplying an energizing signal to said valve means when said conductivity changes beyond a predetermined limit, and

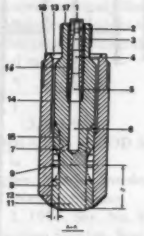
means to support said porous moisture sensor above ground level and in close proximity to the vegetation whereby it will absorb water from the spray during the time the valve means is operative to release spray and dry out at a rate corresponding to that of the vegetation to control the moisture delivered to the vegetation.

3,991,940

OXYGEN-FUEL GAS BURNER NOZZLE

Per-Lennart Lonngren, Oxie, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Apr. 13, 1976, Ser. No. 676,404
Claims priority, application Sweden, Apr. 14, 1975, 7504251
Int. Cl.² F23D 13/26; B05B 7/04
U.S. Cl. 239—430 7 Claims



1. In a burner nozzle for heating, flame cleaning, gas cutting and related processes, having separate inlets for oxygen and fuel gas, a nozzle discharge orifice, and passages for conveying the oxygen and fuel from the inlets, mixing them near the discharge orifice, and passing the mixed gases to the discharge orifice, the improvement wherein the inlet passage from the oxygen inlet includes at least two expansion steps for the oxygen arranged along the central axis of the nozzle, and jet passages connecting the last expansion step to a plurality of discharge channels communicating with the nozzle discharge orifice, said discharge channels being disposed within and extending along an imagined surface of revolution about the central axis of the nozzle, a fuel gas chamber within the nozzle body connected to the fuel inlet, a plurality of closed-ended fuel channels disposed within and extending along said imagined surface of revolution, said fuel channels being connected at one end to said fuel chamber and being closed at the other end, each fuel channel forming a defined angle (α) with and intersecting a corresponding discharge channel at a location along the corresponding discharge channel between its jet passage and the nozzle discharge orifice to form a mixing space for the oxygen and fuel, the space being determined by the depth and width of the discharge and fuel channels and the angle (α) between them, the part of each fuel channel between its closed end and the intersection with its corresponding discharge channel forming a resonator chamber for the gas.

3,991,941

GAS BURNER

William H. Dornbach, Jr., Eastlake, Ohio, assignor to Dornback Furnace and Foundry Co., Eastlake, Ohio

Filed Jan. 24, 1975, Ser. No. 543,680
Int. Cl.² B05B 1/14
U.S. Cl. 239—552 4 Claims

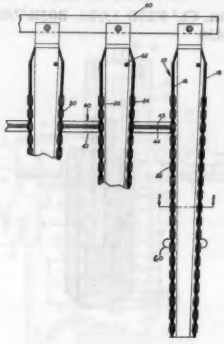
1. A gas burner, comprising:

an elongated lower stamping member being generally U-shaped in section and having outwardly bowed sections spaced along the upper end of each arm thereof;

an elongated upper stamping member being generally U-shaped in section and having inwardly bowed sections spaced along the upper end of each arm thereof; the upper stamping member being received within the lower stamping member with the inwardly and outwardly bowed sections being in juxtaposition with each other; and

a dividing bar longitudinally engaged between the upper

ends of the arms of said upper and lower stamping members and separating said inwardly and outwardly bowed



sections to define longitudinally spaced twin gas ports along an upper portion of the gas burner.

3,991,942

LONG-RANGE NOZZLE

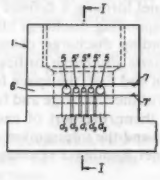
Josef Peitl, Haibach, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jan. 2, 1975, Ser. No. 538,144

Claims priority, application Austria, Jan. 17, 1974, 358/74

Int. Cl.² B05B 1/14

U.S. Cl. 239—566 **15 Claims**



1. A long-range spray nozzle for cooling a strand or supporting and guiding rollers in a continuous casting plant by means of liquid jets or liquid and gas jets ejected in front of the area of a mouth of the nozzle, said nozzle comprising:

a plurality of parallel nozzle channels having a certain hydraulic diameter and a certain length, each channel having an axis and an inlet and an outlet opening, said channels being arranged side by side in a plane with the distance between the nozzle channel axes being related to the hydraulic diameter in such a way as to form a closely bundled long-range spray; and

a transverse channel open in the spraying direction, said transverse channel having two limiting areas parallel to the plane of the nozzle channels, said transverse channel connecting all nozzle channels with each other in the area of the mouth of the nozzle and the location of the limiting areas with respect to the nozzle channels and the distance between the limiting areas being such that they limit the spread of the spray emanating from the nozzle channels.

3,991,943

PROCESS AND EQUIPMENT FOR THE PRODUCTION OF ULTRAFINE POWDERS PARTICULARLY OF COAL POWDERS WITH THE HELP OF A CONTINUOUS COLD WARM INFLUENCE ON THE GROUND MATERIAL

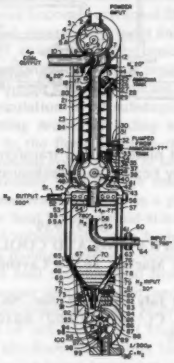
Hans Rohrbach, deceased, late of Bergen, Germany (by Herta Rohrbach, administratrix), assignor to Ilok Powder Company, Inc., Washington, D.C.

Filed Mar. 20, 1975, Ser. No. 560,400

Claims priority, application Germany, Mar. 21, 1974, 2413595

Int. Cl.² B02C 23/00

U.S. Cl. 241—1 **9 Claims**



1. The process for conversion of fine powder, preferably coal powder, of the order of 4 micron size into finer powder in the order of 1/300 to 1/500 micron size, comprising in combination the steps of:

letting the fine powder fall through a vertical tube by force of gravity,

cooling the tube to a temperature in the order of minus 77° C to chill the fine powder,

letting the chilled fine powder fall vertically by force of gravity through an insulated thermal chamber, and

passing a stream of heated inert gas in the order of 780° C upwardly through the powder in a direction counter to the fall of said chilled powder thereby to tear apart the fine powder to finer powder of the sizes aforesaid.

3,991,944

COMMINUTING APPARATUS

Eugene M. A. Baikoff, The Courtyard, 1605 Chexbres (Vaud), Switzerland

Filed Apr. 23, 1975, Ser. No. 570,574

Claims priority, application Switzerland, July 5, 1974, 9297/74

Int. Cl.² B02C 18/18, 18/24

U.S. Cl. 241—36 **15 Claims**

1. An apparatus for comminuting bulky objects, especially vehicle tires, other tough and rubbery materials, and parts of automobile bodies, comprising:

two parallel shafts having a predetermined distance between them,

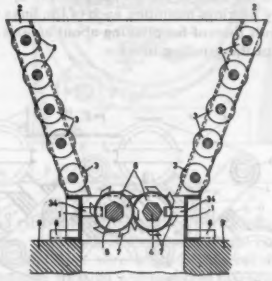
means for rotating said shafts in opposite directions, and

comminuting rings having peripheries of predertermined dimensions, said rings being borne and rotated by said shafts and being alternately axially staggered with respect to one another on each of said shafts,

said predetermined distance and said predetermined dimensions being such that said peripheries of said rings borne

by one of said shafts, when viewed in axial projection, overlap said peripheries of said rings borne by the other of said shafts, a plurality of interstices being formed between portions of said rings and of said shafts, said rings being provided with means including sharp, pointed portions for seizing and comminuting said objects while conveying them through said interstices,

wherein said shafts comprise a number of alternately disposed grooved bearing surfaces and smooth bearing surfaces,



said rings comprise a number of elements, each in the shape of a sector of an annulus and having a grooved, concave, cylindrical inner surface engaged with a portion of said grooved bearing surface,

the said elements of each said ring bearing interconnected by high-strength tangential connecting means, and

each said element having on the outside a said sharp, pointed portion forming a cutter-nose for seizing and comminuting said objects,

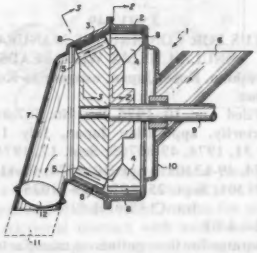
the shape of said cutter-noses being adapted to said objects adn to a desired coarseness of comminuted material.

3,991,945

CENTRIFUGAL MILL

Lothar Kolb, Alpenrod, Westerwald, Germany, assignor to Gebr. Klockner KG, Alpenrod, Westerwald, Germany

Filed Dec. 18, 1974, Ser. No. 534,103
Int. Cl.² B02C *23/28*
U.S. Cl. 241—55 **3 Claims**



1. A centrifugal mill for disintegrating fibrous material such as wood chips, wood shavings and the like, which comprises in combination:

a. a cylindrical grinding track, having corrugations around the interior of its periphery,

b. a conical grinding track positioned immediately adjadcent to said cylindrical grinding track, said conical grinding track having corrugations around the interior of its periphery,

c. the corrugations of said cylindrical track being coarse compared to the corrugations of said conical grinding track,

d. rotary grinding means located interior of both said cylindrical grinding track and said conical grinding track, said rotary grinding means including two sets of outwardly extending grinding blades that are adapted to cooperate with said grinding tracks to thereby disintegrate fibrous material,

e. a charging port for feeding fibrous material to the area between said cylindrical grinding track and the rotary grinding blades located interiorly thereof, and

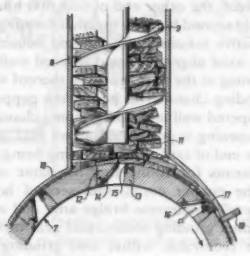
f. a discharge port positioned adjacent to said conical grinding track for discharging disintegrated fibrous material from the centrifugal mill.

3,991,946

MACHINE FOR PRODUCING WOOD SHAVINGS FROM CHIPS

Torsten Lennart Berggren, Nassjo, Sweden, assignor to Cellwood Machinery AB, Nassjo, Sweden

Filed Sept. 2, 1975, Ser. No. 609,776
Claims priority, application Sweden, Sept. 5, 1974, 7411249
Int. Cl.² B02C *18/14*
U.S. Cl. 241—93 **8 Claims**



1. A machine for cutting chips (11) to shavings for use as starting material in the manufacture of, for example, particle boards and similar products, comprising:

a rotatable drum (2) having a hollow interior and a plurality of cutting members (7) distributed along its periphery;

a cylindrical housing (1) enclosing said drum (2);

an outlet (20) for shavings in communication with the hollow interior of said drum;

a feed passageway (8) extending along a substantial portion of said drum in the direction of the longitudinal axis thereof;

a plurality of feed screws (9) in said feed passageway (8) to forcibly feed said chips (11) substantially radially relative to said drum (2);

said drum having gaps (16) in the wall thereof adjacent said cutting members (7) to permit shavings cut by said cutting members (7) to pass through the drum wall and into the hollow drum interior for conveyance in the axial direction of said drum to said outlet (20); and

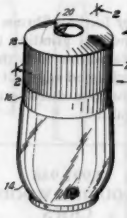
said housing (1) having a widened portion (18) downstream of said feed passageway (8) in the direction of rotation of said drum (2), said widened portion (18) extending gradually further away from said drum in the direction toward said feed passageway, said widened portion (18) defining between itself and said drum (2) a generally wedge-shaped cutting chamber.

3,991,947

SELF-CONTAINED DETACHABLE GRINDING DEVICE

Walter Schlessel, Lawrence, N.Y., assignor to Gemco-Ware, Inc., Freeport, N.Y.

Filed Aug. 15, 1975, Ser. No. 604,939
Int. Cl.² A47J 42/04, 42/08
U.S. Cl. 241—169.1 17 Claims



1. A self-contained grinding device for pepper corns and the like attachable to a container for pepper corns, the grinding device comprising a first hollow housing having one axial end thereof provided with an end wall, said end wall being formed with a grinding chamber defining outer grinding means and a dispensing opening; a second hollow housing having one axial end thereof provided with a tapered wall in the nature of a hopper proximate to said first housing and converging in the direction thereof, the other end of said first housing and said one end of said second housing together forming a rotary joint to permit relative rotation between said housings when they are joined in axial alignment, said tapered wall having a discharging opening at the narrowed end thereof which registers with said grinding chamber to permit the pepper corns to be fed by said tapered wall into said grinding chamber when said discharging opening is positioned above said grinding chamber, the other end of said second housing being provided with connecting means for connecting the same to a container containing the pepper corns, said second housing further having a generally transverse bridge arm; and a gear member defining an inner grinding means, said gear member having a head portion receivable within said grinding chamber for limited axial movements therein and cooperating therewith to grind the pepper corns within said grinding chamber upon relative rotation of said inner and outer grinding means, said gear member further having a shaft portion projecting from said head portion and extending through said first housing and into said second housing, said shaft portion having a bifurcated free end and a length to permit snap-fitting engagement with said bridge arm to substantially lock the relative axial positions of said first and second housings and said gear member to each other and only permit rotational movements of said second housing and said gear member relative to said first housing, whereby rotation of said first and second housings relative to each other causes corresponding rotation of said inner and outer grinding means relative to each other and causes grinding of pepper corns which are guided by said tapered wall from the container to said grinding chamber.

3,991,948

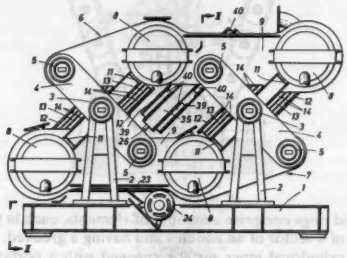
VIBRATORY MILL FOR DISINTEGRATING MATERIAL

Johann Schober, Gleisdorf, and Hermann Zimmer, Graz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna and Binder & Co. Aktiengesellschaft, Gleisdorf, both of, Austria

Filed May 27, 1975, Ser. No. 580,889
Claims priority, application Austria, June 4, 1974, 4605/74
Int. Cl.² B02C 17/14
U.S. Cl. 241—175 10 Claims

1. A vibratory mill for disintegrating material, which comprises

1. a plurality of horizontally extending grinding tubes whose axes are parallel to each other;
2. a carrier whereon the grinding tubes are mounted, the carrier consisting of an upper part and a lower part, a first group of the grinding tubes being mounted on the lower carrier part and a second group of the grinding tubes being mounted on the upper carrier part;
3. at least two pairs of links interconnecting the lower and upper carrier parts, the links forming a parallel crank linkage and having respective ends linked respectively to the lower and upper carrier parts for pivoting about axes parallel to the axes of the grinding tubes;
4. stationary bearings mounting each of the links intermediate the ends thereof for pivoting about an axis parallel to the axes of the grinding tubes;



5. an eccentric drive mechanism arranged to vibrate the carrier in a direction transverse to the axes of the grinding tubes, the drive mechanism including eccentric means for imparting to the carrier an amplitude of vibration of at least 15 mm about a central position of the links which is inclined from the horizontal at an angle of 30° to 60°, the eccentric means being mounted on one of the carrier parts, a first connecting rod connected to the eccentric means, the connecting rod extending at a substantially right angle to the central position of the links, and a spring means connecting the connecting rod to the other carrier part; and
6. connecting means between the carrier parts, the connecting means including second connecting rods extending at a substantially right angle to the central position of the links, and spring means between the rods and the carrier parts.

3,991,949

APPARATUS FOR CONTINUOUS MANUFACTURING ANNULAR HELIX WIRE BEADS

Kashirou Ureshino, Kobe, Japan, assignor to Kobe Steel Ltd., Kobe, Japan

Filed Apr. 10, 1975, Ser. No. 567,013
Claims priority, application Japan, July 11, 1974, 49-82393; July 31, 1974, 49-88705; Sept. 17, 1974, 49-107302; Nov. 18, 1974, 49-133017; Apr. 10, 1974, 49-41244; Sept. 17, 1974, 49-107301; Sept. 25, 1974, 49-110754
Int. Cl.² B65H 81/02
U.S. Cl. 242—4 BE 18 Claims

1. An apparatus for the continuous manufacture of annular helix beads including a winding wire wound around a core wire, comprising:

a core wire drive mechanism for rotating said core wire in its peripheral direction;

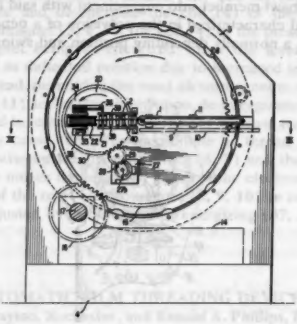
a rotary body rotating, while passing through the ring of said core wire, about a central part thereof;

a rotary body drive mechanism for rotating said rotary body;

a drum support mechanism rotatably disposed within said rotary body and being capable of passing through said

rotary body for performance of loading and unloading operations;

a wire drum, for storing said winding wire, rotatably disposed within said drum support mechanism;



a carrying table for shifting said core wire between different operative stations, and for retaining said core wire while rotating said core wire in its peripheral direction, said table passing through a slit section of radial length provided within said rotary body; and

a loading-unloading mechanism for said drum support mechanism.

3,991,950

METHOD AND APPARATUS FOR MAKING YARN PACKAGES OF CHEESE FORM BY A TEXTILE MACHINE

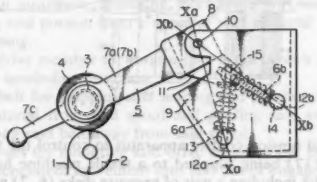
Ichiro Tashiro, Kariya; Kozo Motobayashi, Aichi; Kazuo Kamiya, Nishio; Toshio Yoshizawa, Chiryu, and Yasuo Yamada, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Daiwa Boseki Kabushiki Kaisha, both of Osaka, Japan

Filed Feb. 5, 1974, Ser. No. 439,741

Claims priority, application Japan, July 17, 1973, 48-81101; Feb. 9, 1973, 48-16286

Int. Cl.² B65H *54/42*

U.S. Cl. 242—18 DD **5 Claims**



1. In an apparatus for winding cylindrical yarn packages on a bobbin with a winding unit of a textile machine wherein each said unit comprises a friction roller, means for urging a yarn package into frictional contact with said friction roller to rotate said yarn package during a winding operation and means for adjusting the contact pressure between said yarn package and said friction roller during the winding operation, the improvement wherein said means for urging said yarn package into contact with said friction roller comprises support means, arm means pivotally mounted on said support means, and holding means on said arm means for rotatably supporting said yarn package in contact with said friction roller to produce an increasing component of said contact pressure as the size of the yarn package increases and wherein said adjusting means comprises projection means on said arm means, and first and second compression spring means positioned between said support means and said projection means to exert a rotational force on said arm means, said first spring means being mounted to provide a turning moment on said arm means that initially acts in the same direction as the weight of said yarn package, and acts in a direction opposite of the weight of the yarn package as the size of said yarn package increases, said second spring means being mounted to continually provide a turning moment on said arm means that opposes the weight of said yarn package as the size of said yarn package increases, whereby said contact pressure of said friction roller exponentially decreases said contact pressure as the size of said yarn package increases, and whereby the rate of decrease of said contact pressure is gradually reduced as the size of the yarn package increases.

3,991,951

APPARATUS FOR FEEDING COILS OF STRIP TO AN UNWINDING STATION

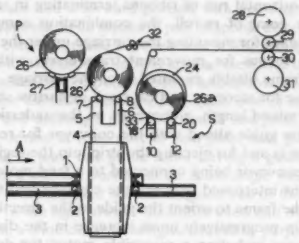
Cesare Galletti, Milan, Italy, assignor to Innocenti Santeustacchio S.p.A., Italy

Filed Dec. 24, 1975, Ser. No. 644,182

Claims priority, application Italy, May 2, 1975, 22957/75

Int. Cl.² B21C *47/16*

U.S. Cl. 242—78.6 **4 Claims**



1. Apparatus for feeding successive coils of strip to an unwinding station, particularly an unwinding station of a tandem rolling mill, comprising:

a transfer carriage,

a vertically movable support,

actuator means for moving said support vertically,

at least two driven rollers mounted on said support for supporting a coil of strip, the said driven rollers being radially spaced apart and rotating around respective parallel axes, and

means for moving the said transfer carriage from a coil entry station to an unwinding station, wherein the improvement consists in:

a. at least one retractable arm at the unwinding station having at one end an idler roller for supporting said coil while permitting rotation thereof,

b. means for selectively moving said retractable arm between a retracted position in which the respective idler roller is disposed at one side of said transfer carriage when this carriage is at the unwinding station and an extended position in which said idler roller is located between said driven rollers when the transfer carriage is at the unwinding station,

c. at least one device supporting a further idler roller for rotatably supporting said coil, said device being movable between a retracted position in which it does not interfere with the movement of the transfer carriage and an extended position in which said idler roller is at substantially the same height as idler roller of said retractable arm in the extended position of the latter, and

d. one of the said driven rollers being positioned between said idler rollers so that, upon lowering the said support by its actuator means, a coil originally supported by the

driven rollers is caused to rotate towards the idler rollers and is thus transferred from the driven rollers to said idler rollers.

3,991,952

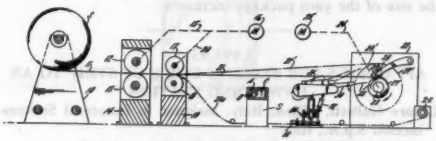
SHIM STRIP INSERTER FOR SLITTING AND RE-ROLLING MACHINE

Hugo Altman, and Patrick L. Ryan, both of Minneapolis, Minn., assignors to Fullerton Metals Co., Northbrook, Ill.

Filed June 30, 1975, Ser. No. 591,655

Int. Cl.[2] B65H *19/04*

U.S. Cl. 242—56.9 12 Claims



1. In a shim inserter for a slitting and re-rolling machine having a wide supply rool, a slitter therefor, and a driven take-up mandrel for re-rolling the resulting ribbons, with the take-up mandrel being spaced from the slitter to define a generally horizontal run of ribbons terminating in respective nips at the point of re-roll, the combination comprising a carriage, means for mounting the carriage under the horizontal run of ribbons for movement transversely with respect thereto, a frame tiltably mounted upon the carriage, a hopper on the frame for storing a vertical stack of narrow shim strips of predetermined length, a conveyor on the underside of the stack, a strip guide alined with the conveyor for receiving a conveyed strip and for ejecting the strip into the region of the nips, said conveyor being connected to a feed motor, power tilting means interposed between the carriage and the frame for tilting the frame to orient the guide in the direction of the adjacent nip progressively upon increase in the diameter of re-roll, means including a reversible motor for driving the carriage in opposite directions, and a control station located at a position safely remote from the nips and including (a) a first control connected to the power tilting means to adjust the angle of tilt of the frame in accordance with re-roll diameter, (b) a second control connected to the carriage motor to bring the carriage into a registered position with a selected loose one of the rewound ribbons and (c) a third control connected to the feed motor for ejection of a shim strip into the nip of the loose ribbon.

3,991,953

AUTOMATIC LOCKING SAFETY BELT RETRACTOR

Takeso Takada, deceased, late of Hikone, Japan, and by Juichiro Takada, legal heir, Tokyo, Japan, assignors to Takata Kojyo Co., Ltd., Tokyo, Japan

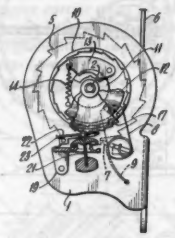
Filed June 14, 1974, Ser. No. 479,690

Claims priority, application Japan, June 21, 1973, 48-069218

Int. Cl.[2] A62B *35/00;* B65H *75/48*

U.S. Cl. 242—107.4 A 2 Claims

1. A vehicle safety belt retractor device comprising a retractor reel spring biased to rotate in a belt retracting direction and including a shaft rotatable therewith, a first ratchet wheel rotatable with said reel, a first pawl member movable between positions engaging and disengaging said first ratchet wheel, a second ratchet wheel journalled on said shaft, means coupling said second ratchet wheel to said first pawl member to rock said first pawl member to its first ratchet wheel engage position with a predetermined rotation of said second ratchet wheel, a fly wheel rotatable in said shaft, a second pawl member mounted on said fly wheel and rockable between positions engaging and disengaging said second ratchet wheel and spring biased to a ratchet disengage position and including a follower portion, a cam member mounted on and rotatable by said shaft in engagement with said follower portion to shift said second pawl member into engagement with said second ratchet wheel upon said fly wheel lagging the rotation of said cam member whereby to rock said ratchet wheel and advance said first pawl member into engagement with said first ratchet wheel and characterized in the provision of a pendulum supported in a normally depending position and swingable to an



advanced position in response to a predetermined acceleration of the vehicle to which the device is attached, a third ratchet wheel rotatably mounted on said shaft and drive coupled to said fly wheel, a third pawl member movable in and out of engagement with said third ratchet wheel and spring urged out of engagement therewith, and means responsive to the swinging of said pendulum to its advanced position for advancing said third pawl into engagement with said third ratchet wheel.

3,991,954

THREAD TENSION CONTROL APPARATUS FOR TEXTILE MACHINERY

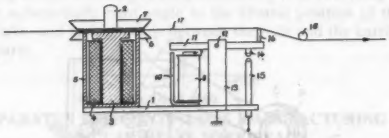
Hermann Schwartz, Pfaffikon, Switzerland, assignor to Siegfried Peyer, Bach, Switzerland

Filed Aug. 13, 1975, Ser. No. 604,229

Claims priority, application Switzerland, Sept. 6, 1974, 12160/74

Int. Cl.[2] B65H *59/22*

U.S. Cl. 242—150 M 8 Claims



1. Thread tension control apparatus to control the tension of thread (17) being supplied to a textile machine having a thread brake including a pair of pressure disks (6, 7) adapted to have the thread passed therebetween, and a pressure electromagnet (3, 4, 5) acting on at least one of the disks (7) to press the disks together with a force dependent on the energization of the magnet, to thus control the tension of thread passing between the disks,

said apparatus comprising

an oscillating lever (11) engaged by the thread (17) and urged by tension of the thread from a first position into a deflected position;

a reset electromagnet (8, 9, 10) acting on the lever (11) and, when energized, tending to move the lever to the first position and counter to the deflection position;

means (37, 38) adjustably energizing the reset electromagnet (8, 9, 10);

contact means (14, 15) operated by the lever (11), the lever (11) switching the contact means between open and

closed position as the lever moves between deflected and first position;

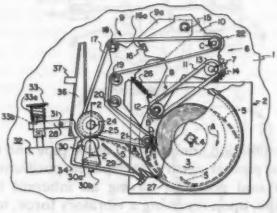
a control circuit (S1) connected to the coil (4) of the pressure electromagnet (3, 4, 5) and connected to and controlled by the contact means (14, 15) to repetitively energize and de-energize the coil (4) of the pressure electromagnet (3, 4, 5), the coil (4) of the pressure electromagnet being de-energized when the lever (11) is moved to deflected position due to increased tension on the thread, permitting the reset elctromagnet to move the lever (11) to first position upon de-energization of the coil and to re-energize the coil (4) to increase tension and thereby cause the lever to oscillate as thread is pulled from between the pressure disks (6, 7) and the pull-off tension moves the lever (11) against the electromagnetic force of the reset electromagnet (8, 9, 10) as controlled and adjusted by said adjustable energizing (37, 38).

3,991,955

AUTOMATIC FILM THREADING DEVICE

Bruce E. Crayton, Rochester, and Ronald A. Phillips, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,193
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—192 **13 Claims**



1. An automatic threading mechanism for removing the leading end portion from a spool of web material or the like comprising:

a. a drive member for rotating the spool of web material in an unwinding direction;

b. a belt for stripping said leading end portion of said web material from said spool and guiding said end portion along said belt away from said spool;

c. means for mounting said drive member and said belt for independent movement into and out of engagement with the outer periphery of said spool of web material;

d. means for driving said drive member in a direction for effecting movement of said spool in an unwinding direction;

e. means for driving said belt in a direction opposite to said drive member;

f. guide roller means for receiving said end portion of said web material after it has been stripped from the spool;

g. pressure roller means capable of moving into engagement with said web material and forcing said web material against said belt, thereby providing a positive drive to said web material; and

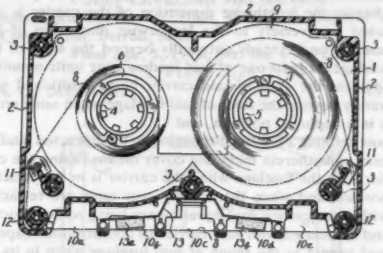
h. means for (1) sensing the presence of said end portion of said web material after it has passed between said guide roller means and said pressure roller means and (2) moving said drive member and said belt out of engagement with said spool in response to such sensing.

3,991,956

TAPE CASSETTE

Tetsuo Machida, Tagahya, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 14, 1975, Ser. No. 540,965
Claims priority, application Japan, Jan. 18, 1974, 49-8447[U]
Int. Cl.² G03B *1/04*; G11B *15/32, 23/04*
U.S. Cl. 242—199 **9 Claims**



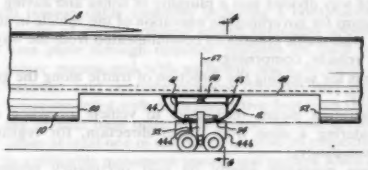
1. A tape cassette comprising a housing having a pair of parallel walls and a forward portion with openings therein to receive magnetic head means; a pair of spools disposed side by side in a common plane between said walls; a magnetic tape wound onto at least one of said spools, each end of said tape being attached to a respective one of said spools, and a portion of said tape extending along a path from one of said reels to the other and defining a planar section of said path; tape guide means to define at least part of said path, said guide means comprising at least one guide roller having a guiding surface comprising a conical portion at an acute angle with the magnetic tape in said planar section to guide one of the longitudinal edges of the tape toward the constricted end of said conical portion, a shoulder extending substantially perpendicularly to the axis of said conical portion at the restricted end of said conical portion, and an axle for said roller, said axle being rigidly connected to said housing in a region of said path between said guide member and the adjacent one of said openings.

3,991,957

TURNOUT LANDING GEAR ARRAY CARRIER FOR HIGH-WING AIRCRAFT

Frank D. Neumann, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 451,947, March 18, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,235
Int. Cl.² B64C *25/16*
U.S. Cl. 244—102 R **8 Claims**



3. A landing gear system for supporting an aircraft fuselage, said fuselage having fixed wings mounted thereon at a location high on said fuselage, said landing gear system comprising:

an elongated multi-unit landing gear carrier,

means mounting the carrier intermediate its ends on the aircraft fuselage below the location of and separately from said wings for rotation about a vertical axis relative to said fuselage,

a plurality of individual landing gear units,

means retractively mounting the landing gear units on the carrier at intervals spaced along the lengthwise dimension of the carrier, at least one of said landing gear units being mounted at a location adjacent each of the ends of said carrier,

means for rotatably driving the carrier about the vertical axis between a retracted position wherein the lengthwise dimension of the carrier extends parallel to the lengthwise dimension of the fuselage and a deployed position wherein the lengthwise dimension of the carrier is oriented transversely to the lengthwise dimension of the fuselage and extends outwardly beyond the sides of the fuselage, at least one of said landing gear units mounted adjacent the ends of said carrier being positioned outwardly beyond the sides of said fuselage when said carrier is in a deployed position, and

means defining a housing for enclosing the retracted landing gear units therein including cover means fairing the carrier with the fuselage when the carrier is in its retracted position and when the landing gear units are retracted within the carrier, said cover means being so constructed and associated with said carrier to conform the shape of said carrier to the shape of said fuselage when in its retracted position.

3,991,958

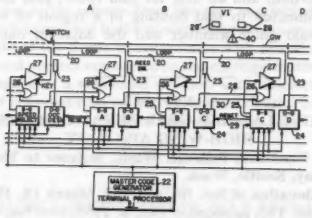
MAGNETICALLY ACTUATED REGISTRATION CIRCUITRY FOR A VEHICLE CONTROL SYSTEM

Henry C. Sibley, Adams Basin; John H. Auer, Jr., Fairport, and Willis R. Smith, Rochester, all of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Division of Ser. No. 471,390, May 20, 1974, Pat. No. 3,907,238, which is a division of Ser. No. 344,681, March 26, 1973, Pat. No. 3,825,744, which is a division of Ser. No. 152,845, June 14, 1971, Pat. No. 3,748,466. This application June 23, 1975, Ser. No. 589,113

Int. Cl.² B61L *21/06, 21/10*

U.S. Cl. 246—34 R **3 Claims**



1. A vehicle control system for operating vehicles over a right-of-way divided into a plurality of zones and having control means for governing the operation of the vehicle in accordance with traffic conditions communicated from the wayside to the vehicle, comprising:

means for selecting the direction of traffic along the guideway;

registration means responsive to vehicle presence upon entering a zone from either direction, for registering occupancy;

means governed jointly by said occupancy responsive means and said direction selecting means for rendering said control means operative to restrictive aspects in accordance with a selected number of zones behind a leading vehicle relative to said selected direction of traffic;

said registration means including a magnetically actuated switch means responsive to the entering end of the vehicle for providing an occupancy pulse upon the entrance of the front of the vehicle into a zone, and producing a clearing pulse upon the passage of the rear of the vehicle into the next block in advance of said associated zone; and

said registration means including a bi-stable magnetic stick relay responsive to the switch means energized in response to the occupancy pulse, and de-energized in response to the clear pulse, and a neutral stick relay de-energized for providing an occupancy indication upon energization of the magnetic stick relay and energized for producing a clear signal upon de-energization of the magnetic stick relay by a clear pulse and de-energization of the neutral strick relay for the next zone over a back contact thereof.

3,991,959

PIPE INSTALLATION

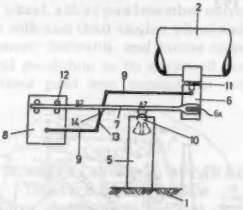
Peter Albus, Bensberg, Germany, assignor to Interatom, Internationale Atomreaktorbau GmbH, Bensberg, Cologne, Germany

Filed Apr. 17, 1975, Ser. No. 568,861

Claims priority, application Germany, Apr. 27, 1974, 2420571

Int. Cl.² F16F *15/28*

U.S. Cl. 248—49 **4 Claims**



1. A pipe installation comprising a metal pipe and means for supporting the pipe at axially interspaced positions with the pipe between said positions having an inherent resonance causing the pipe, upon receiving a vibratory force, to oscillate at a low frequency and a consequent great amplitude which excessively stresses the pipe, a balance beam having a fulcrum and relatively shorter and longer arms having outer end portions, means for connecting the outer end portion of the shorter arm to said pipe at a location between said positions, and a mass connected to the outer end portion of the beam's longer arm and balancing the beam at equilibrium, said pipe being subject to thermally induced axial movement at said location, the second-named means permitting said axial movement relative to the outer end portion of the beam's shorter arm, and said mass being movable to permit maintenance of said balancing regardless of said axial movement.

3,991,960

DEVICE FOR SUPPORTING ELECTRIC WIRES, CORDS AND OTHER ELONGATED BODIES

Toshie Tanaka, Machida, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Oct. 31, 1975, Ser. No. 627,581

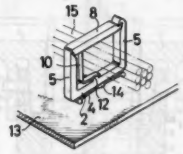
Claims priority, application Japan, Oct. 31, 1974, 49-131144

Int. Cl.² F16L *3/22*

U.S. Cl. 248—68 R **2 Claims**

1. A device for supporting electric wires, cords and other elongated bodies, which comprises a "U"-shaped main body including an elongated base and a pair of arms each extending perpendicularly from opposite ends of said base, one arm having a catch means at the free end thereof, a lid member hingedly connected to and extending from the free end of said other arm and adapted to extend between the free ends of said

arms and engage said catch, and a spring member extending from the inner wall of said lid member facing said base, said spring member including a thick, substantially rigid portion extending substantially perpendicularly to said lid from a position adjacent to said hinge connection and having a length



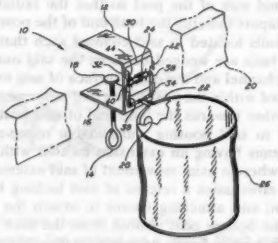
substantially less than said other arm and a relatively thinner portion which is brought to resiliently bear against said base when said lid member is moved to its closed position, thus giving said lid member force in its opening direction, and means to restrain said thinner portion against movement relative to said base.

3,991,961

COLLAPSIBLE SUPPORT STRUCTURE

George E. Platzer, Jr., 31881 Staman Court, Farmington Hills, Mich. 48024

Filed Mar. 3, 1975, Ser. No. 554,440
Int. Cl.[2] B65B 67/12
U.S. Cl. 248—99 5 Claims



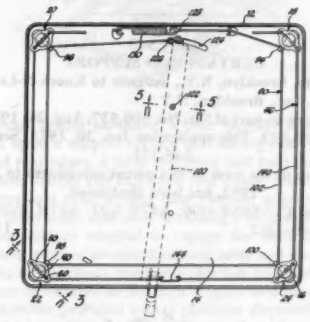
1. A support assembly, comprising collapsible holder means, pivotal support means carrying said collapsible holder means, and detachable securing means operatively connected to said pivotal means, said securing means being effective for securing said pivotal support means to an associated support structure, enabling said pivotal support means to pivotally assume at least first and second positions, said collapsible holder means assuming an extended condition in said first position, and said collapsible holder means assuming a contracted condition in said second position, said securing means comprising a U-shaped member adapted to be removably fixedly secured to said associated support structure, said U-shaped member comprising a bight section, said pivotal support means comprising a hoop-like section, said hoop-like section being generally perpendicular to said bight section in said first position, and said pivotal support means further comprising an extension section operatively formed on and connected to said hoop-like section so as to be perpendicular to said hoop-like section, said extension lying parallel to said bight section in said first position, the end of said extension section being pivotally attached to said bight section, said end of said extension comprising shaft members formed so as to be directed toward each other for engagement with bearing means carried on said bight section, said bearing means comprising an open-ended ridge integrally formed with said bight section of said U-shaped structure, said side thrust reaction members comprising tab means integrally formed with said bight section and extending therefrom to a position generally outboard of said extension section when said pivotal support means is in said first position, and said detent means comprising second tab means integrally formed with said bight section and extending therefrom, said second tab means being effective to engage said extension section when said pivotal support means is in said second position.

3,991,962

SELF-LEVELING MECHANISM

Laszlo I. Kovats, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,722
Int. Cl.[2] F16M 11/26, 11/24
U.S. Cl. 248—188.5 4 Claims



1. A full-floating type, self-leveling support comprising a base plate having openings therein spaced about the periphery thereof, a leg assembly for each opening, each leg assembly including a foot slideably movable with respect to said base plate through the respective opening for full-floatingly engaging a fixed surface adjacent said base plate as said base plate is oriented with respect to said surface, a tension cable assembly interconnecting each foot and urging each foot in a direction to engage said surface, and a locking cable assembly for locking each foot against slideable movement with respect to said base plate after said base plate is oriented,

each leg assembly including a foot retainer means having stop means engaging said base plate on one side thereof at a respective opening and a support means in juxtaposition with said retainer means and having stop means engaging said base plate on the other side thereof to sandwich said base plate therebetween, both said retainer means and support means having gripping means loosely, guidingly supporting a respective foot throughout slideable movement thereof relative to said retainer means and support means,

said tension cable assembly including a continuous cable means of predetermined length extending around said base plate through opposite portions on each foot retainer means and with sufficient slack to form a loop between said opposite portions drivingly and yieldingly interconnected with each respective foot such that rocking of said base plate with respect to said surface will cause at least one of said loops to drive its respective foot in a slideable movement toward said surface while at least another of said loops yields to facilitate the slideable movement of its respective foot in a direction away from said surface,

said locking cable assembly including a slot in each foot along a longitudinal dimension thereof, a cam of lesser longitudinal dimension than said slot and relatively, slideably movable therewith both longitudinally and transversely, said cam located between said gripping means and oriented with respect to said base plate to lock said

retainer means and support means on said base plate against unlimited movement in a direction toward said surface, a locking cable means connected at one end with respect to said base plate and extending around said base plate for interconnecting each oriented cam to assemble all leg assemblies on said base plate, and lever means pivotally mounted with respect to said base plate and connected to the other end of said locking cable means, the pivotal movement of said lever means tensioning said locking cable means to slideably move said cams transversely into sliding engagement with the sides of respective slots to spread said sides into locking engagement with said gripping means, thereby to prevent slideable movement of each foot longitudinally with respect to said base plate and thus out-of-orientation movement of said base plate with respect to said fixed surface.

3,991,963

CURTAIN ROD SUPPORT

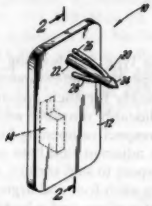
Alan J. Solo, Brooklyn, N.Y., assignor to Knock-N-Lok International, Inc., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 500,537, Aug. 26, 1974, Pat. No. 3,895,773. This application Jan. 30, 1975, Ser. No. 545,375

The portion of the term of this patent subsequent to July 22, 1992, has been disclaimed.

Int. Cl.² E06B *9/00*; **A47N** *5/32*; **A47H** *1/10*

U.S. Cl. 248—262 **11 Claims**



1. A curtain rod holder and like holders comprising a support member; a hook extending from said support member and configurated to engage and support a curtain rod; and anchor means for maintaining said support member mounted on relatively brittle penetrable wall, said anchor means including an elongate shank, said shank having one end thereof pointed and suitable for being driven into a penetrable wall, the other end of said shank cooperating with said support member and being suitable for being hammered to advance the pointed end of said shank through the penetrable wall and for being engaged to permit turning of said shank about the axis thereof, at least one projection extending from said shank proximate to the pointed end and inclined relative to said shank in the direction of said head, said projection being integrally formed with said shank and being flexible and resilient to permit the same to be deformed and at least partially wrapped about the axial length of said shank whereby hammering said anchor means into a penetrable wall causes the wall material to flex said projection to a position substantially coextensive with said shank, and turning of said shank about the axis thereof, causes said projection to flex and become twisted about said shank, the resiliency of said projection causing the same to tend to flare radially outwardlay from the axis of said shank to become wedged between the latter and the wall material to thereby secure said anchor means and said support member and place and resist the same from becoming removed from the wall.

3,991,964

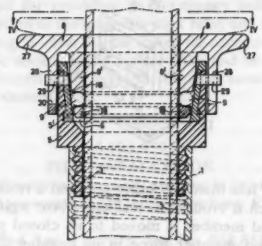
SELF-LOCKING DEVICE FOR TELESCOPIC PROPS

Stanley A. Christopher, Broadclyst, England, assignor to Evan John and Sons (Kenfig Hill) Limited, Kenfig Hill, England

Filed Dec. 10, 1974, Ser. No. 531,417

Int. Cl.² E04G *25/00*, *25/08*; **B66F** *3/08*

U.S. Cl. 248—354 R **11 Claims**



1. A self-locking support for a telescopic prop, comprising an extension member, a hollow section post having a base end adapted to rest on a supporting surface, the internal dimensions of the post being such as to receive the extension member for sliding movement within the hollow section post, and a locking device carried at the end of the post remote from the base, said locking device comprising a housing adapted to surround the extension member; means defining within said housing an annular circumferential internal channel, the radially outer wall of the annular channel being inclined to the longitudinal axis of the post so that the radial width of the channel tapers towards the base end of the post; a plurality of locking balls located in said channel such that in use of the post the balls are wedged between the said outer wall of the annular channel and the outer surface of said extension member located within the post to prevent movement of the extension member towards the base end of said post; cover means attached to said housing and slidable relative thereto, said cover means having an extension located within the annular channel wherein axial movement of said extension out of said chennel effectuates a release of said locking balls from said extension; and attaching means to attach the housing to an end of the hollow post remote from the base such that said housing is longitudinally adjustable with respect to the hollow post.

3,991,965

CHAIR HEIGHT ADJUSTING MECHANISM

Fred R. Westover, Canfield, and Philip J. Williams, Youngstown, both of Ohio, assignors to GF Business Equipment, Inc., Youngstown, Ohio

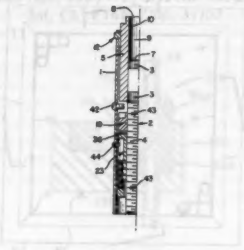
Filed Jan. 27, 1976, Ser. No. 652,667

Int. Cl.² F16M *13/00*, *11/24*; **A47C** *3/24*

U.S. Cl. 248—406 **11 Claims**

1. Height adjusting mechanism for a chair seat including, a base column, a screw post having a threaded periphery disposed within said base column, bearing means radially supporting said post within said column, an adjustment nut within said column having internal threads engaging said post threaded periphery, lock means within said column above said nut, catch means on said nut engageable with said lock means to arcuately immobilize said nut relative said column, spring means within said column applying a constant upward force upon said nut and likewise upon said post through said engaged threads, said spring means force sufficient to elevate said nut and its engaged post into abutment between said nut catch means and column lock means to limit the upward displacement of said nut when no outside mass is acting upon said post, whereby subsequent rotation of said post produces a raising or lowering of said post relative said immobilized nut and when an outside mass is acting upon said post said post

and nut is lowered against the force of said spring means as said lock and catch means are disengaged whereupon subsequent rotation of said post within said bearing means does not alter the elevation of said post as said nut is arcuately displaced as a unit with said post.



3,991,966

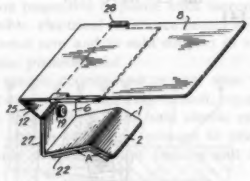
PORTABLE DESK DEVICE

Carl Breer, II, 45 Preston Place, Grosse Point Farms, Mich. 48236

Continuation-in-part of Ser. No. 569,069, April 17, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,248

Int. Cl.² A47B *97/04*

U.S. Cl. 248—444 **6 Claims**



1. A portable desk device, comprising

a holder member for resting on a user's thigh, said holder member comprising a substantially plate-like thigh part having a pair of spaced opposite major surfaces and an edge, said thigh part being bent at an obtuse angle to form an angular surface portion of between 120° and 160° for resting on a user's thigh, and a substantially plate-like support part extending from the edge of the thigh part at substantially right angles therewith, said support part extending from the opposite surface of said thigh part from that having the angular surface portion;

a desk member for use by the user as a desk, said desk member comprising a substantially plate-like rest part having a pair of spaced opposite major surfaces and an edge, and a substantially plate-like mounting part extending from the edge of the rest part at substantially right angles therewith, said mounting part extending from the opposite surface of said rest part from that used as a desk surface; and

fastening means adjustably movably affixing the desk member to the holder member for rotation of the mounting part of the desk member substantially coplanar with the support part of the holder member about an axis substantially perpendicular to said mounting part and said support port and for movement of the rest part of the desk member relative to the thigh part of the holder member to vary the distance therebetween, the rest part of said desk member being supported in cantilevered fashion by said mounting part and overlying the thigh part of said holder member.

3,991,967

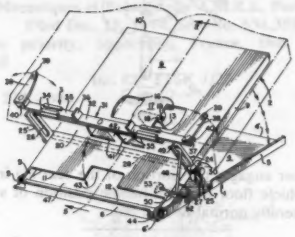
BOOK HOLDER

Harry Sack, 2201 Massachusetts Ave., NW., Washington, D.C. 20008

Filed May 10, 1976, Ser. No. 684,937

Int. Cl.² A47B *97/04*

U.S. Cl. 248—448 **11 Claims**



1. A book holder including, a base member adapted to be disposed upon a support surface and having side flanges and front and rear edges, a table overlying said base member and having side flanges and front and rear edges, means pivotally connecting said table to said base member adjacent said respective front edge, said table including a substantially planar supporting surface adapted to engage the back of an open publication, a brace intermediate said table and base member adjustable to selectively position and retain said table supporting surface at variable inclinations relative said base member, a shelf member provided with a platform disposed atop said table and adapted to support the front edge of a publication disposed upon said table, said platform including side brackets overlying said table side flanges and each having an elongated slot therein, releasable fastener means disposed through said bracket slots and table side flanges to pivotally and slidably connect said shelf member to said table, a slide assembly carried by said shelf member, said slide assembly including a pair of laterally displaceable slide members each having an outer free end and a page holding finger pivotally attached to each slide member adjacent said free end whereby, publications of various thicknesses and widths may be accommodated by manipulating said fastener means to allow raising or lowering of said shelf member relative said table and said slide members may be independently laterally positioned to allow selective pivoting of said fingers to engage the margins of the open publication therebeneath.

3,991,968

QUICK RELEASE SEAT RETAINER

Diran Yazejian, Bloomfield Hills, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

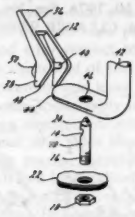
Filed May 27, 1975, Ser. No. 581,316

Int. Cl.² F16A *15/00*

U.S. Cl. 248—501 **4 Claims**

1. In a detachable seat for automotive vehicles comprising a seat frame, supporting legs for the seat frame each leg having a lower portion adapted to rest upon the vehicle floor and an aperture in each lower portion, a quick release clamping unit comprising a pin disposed in said aperture and extending outwardly on each side of said leg lower portion, one end portion of said pin being secured to said floor to position said pin generally normal thereto and the opposite end portion being provided with a notch, a compression lever comprising two L-shaped members spaced apart an amount sufficient to receive said pin therebetween, one leg of each of said L-shaped members having a caming surface compression foot and the other leg of each of said L-shaped members being a handle, a fulcrum pin extending between the L-shaped members adjacent the juncture of the long and short legs comprising the L-shape said compression lever being pivotally

mounted on said pin with said fulcrum pin received in said slot of said pin, said lever being moveable to an overcenter seat retaining position wherein the compression foot of said compression lever engages the portion of the seat leg in contact with the vehicle floor and the handle position of said lever extends generally normal to said pin.



3,991,969

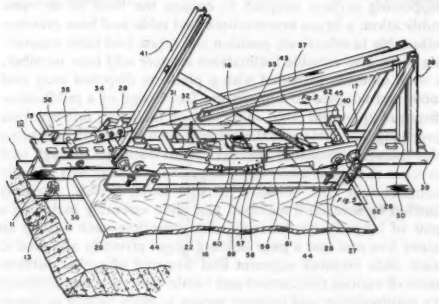
FORM POSITIONING APPARATUS

Ronald A. Oxyer, 10262 Mills Station Road, Rancho Cordova, Calif. 95670

Filed Nov. 26, 1975, Ser. No. 635,759

Int. Cl.² E02B 1/00

U.S. Cl. 249—20 **3 Claims**



1. In form positioning apparatus used for securing flat forms in place for continuous sequential pouring of concrete walled structures of the type utilizing an extended jacking I beam having its inner flange secured to the wall and its outer flange providing the support for a pair of moving beams which, in turn, support cooperating compression beams working through wedges to maintain a compression force against a form placed against the inner surface of the inner flange, the improvements eliminating the wedges comprising:

at least one compression lever for each pair of moving and compression beams pivotally connected to one beam and interacting with the other beam to provide the compression force between the compression beam and the form.

3,991,970

RETAINER CLIP FOR SECURING A HOT TOP

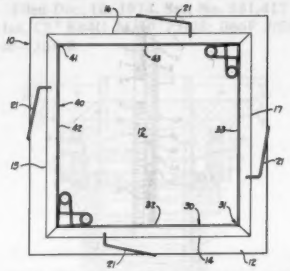
James J. Malik, 6618 Bennington Drive, Parma Heights, Ohio 44130

Filed May 12, 1975, Ser. No. 576,345

Int. Cl.² B22D 7/10

U.S. Cl. 249—106 **5 Claims**

1. A device for securing a hot top for an ingot mold having an open top and inner walls of generally rectangular outline against which an inner liner of plural sideboards is supported near said open top, comprising a pair of diagonally oppositely disposed L-shaped continuous wire retainer clips for biasing said inner liner into closefitting engagement with said inner walls, each of said clips having at least one resilient loop near the end of each of two arms, each of said arms extending snugly along substantially the entire length of each of two sideboards in end-adjacent relationship with each other and, the end portion of each arm beyond said loop biasing against one of the next adjacent sideboards.



3,991,971

SHUT-OFF MECHANISM FOR THE VENT PASSAGE OF A CASTING MOLD

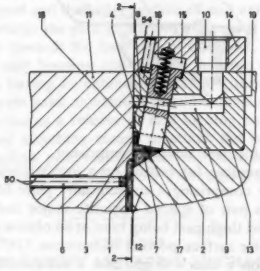
Johannes Drake, Elsen, Germany, assignor to Gebrueder Buehler AG, Switzerland

Filed July 21, 1975, Ser. No. 597,352

Claims priority, application Germany, July 23, 1974, 2435272

Int. Cl.² B29C 1/14

U.S. Cl. 249—141 **7 Claims**



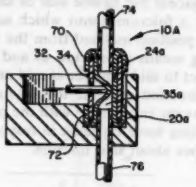
1. A device for regulating the flow of moldable material from a mold which has two mold which are separable along a parting plane and with a vent passage which extends from the interior of the mold defined between the parts adjacent the separating plane of the parts, comprising block means associated with said mold parts and being disposed alongside the parting plane and having a vent continuation passage including a first vent continuation passage portion, a piston bore defined in said block means at a spaced location from the parting plane having a first end in communication with said first vent continuation passage portion, a piston slidable in said piston bore and having a transverse valve opening therein, biasing means biasing said piston toward said first vent continuation passage portion, said piston being displaceable against said biasing means by the flow of moldable material through the vent passage and said first vent continuation passage portion, a second vent continuation passage portion extending between said first vent continuation passage portion and said piston valve opening, and a third vent continuation passage extending outwardly from said piston valve bore on the opposite side thereof from said second vent continuation passage portion.

3,991,972

ELECTRICALLY OPERATED PROPORTIONATE VALVE

Thomas Eaton, Hawthorne, Calif., assignor to ITL Technology Inc., Hawthorne, Calif.

Filed Apr. 21, 1975, Ser. No. 569,597
Int. Cl.² F16K 7/06, 31/02
U.S. Cl. 251—11 3 Claims



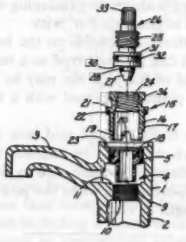
1. A valve assembly having a passage therethrough for passing a fluid comprising:
a support;
a sleeve carried by said support defining said passage for said fluid, said sleeve having a lateral hole;
a pivotal arm adjacent said sleeve having a finger inserted in said lateral hole for variably constricting said passage between closed and fully open positions;
an elastic tube operably associated with said pivotal arm and arranged to move said arm for variable opening of said passage, said tube extending through and lining said sleeve and contacting said finger the opposite ends of said tube respectively folded over the outer periphery of said sleeve on respective opposite ends thereof;
an expansible, electrical resistance heater wire connected to said pivotal arm and to said support in a stretched normally taut position; and
a circuit means cconnected to said wire for passing an electric current therethrough to heat, expand and thereby slacken said wire, so that said elastic tube moves said pivotal arm to open said passage in proportion to the magnitude of said current heating and expanding said wire.

3,991,973

CARTRIDGE VALVE WITH MULTIPLE SHUT-OFF

William E. Politz, Delphi, Ind. 46923, and Gerald E. Christiansen, Flora, Ind. 46929

Filed Feb. 13, 1975, Ser. No. 549,543
Int. Cl.² F16K 1/34
U.S. Cl. 251—210 4 Claims



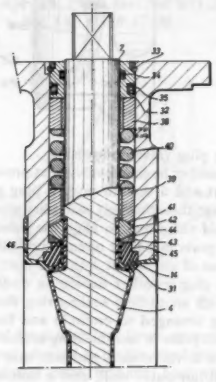
1. In faucet construction of the class described, in combination, a faucet body, an inlet and an outlet therefor, a control valve section intermediate said inlet and outlet, said section including provisions for mounting control valve means therein, said means comprising a threaded portion to receive a threaded seat and a non-threaded seat of generally similar dimensions and configuration, a seat, a bonnet, and a stem, the stem having a plurality of shut-off means carried thereby in fixed relationship to one another, operable sequentially in the closing direction movement of said stem at predetermined uniform intervals, the bonnet having means thereon to engage the non-threaded seat when the same is in place to maintain the same in sealed position in the section.

3,991,974

BUTTERFLY VALVE

Maurice Bonafous, Gurmencon, France, assignor to Applications Mecaniques et Robinetterie A.M.R.I., Paris, France

Filed Dec. 18, 1974, Ser. No. 534,355
Claims priority, application France, Dec. 19, 1973, 73.45502
Int. Cl.² F16K 1/22
U.S. Cl. 251—306 6 Claims

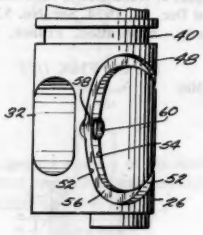


1. A butterfly valve comprising a body having an internal cylindrical bore with two radial coaxial passages diametrically opposed with respect to said bore, a butterfly including a spherical cap section and two coaxially projecting shafts rotatably mounted in said passages and providing pivotal movement of said butterfly in said body between opened and closed positions, an annular elastomeric seat of U-shaped section covering the bore and the outer side faces of said body, said seat receiving the shafts of the butterfly and including at each of said passages a portion of spherical shape substantially complementary to that of the cap section of the butterfly and a cuff portion surrounding the associated shaft, a support independent of the seat and constituted of an elastomeric material housed in an annular groove provided in said body which the support completely fills, said support having a free surface in contact with the base of the U-shaped section of the seat, said support comprising a cuff portion surrounding each said shaft and bearing against the cuff portion of the associated seat and permanently compressing the spherical portions of the seat against the respective cap portions of the butterfly to assume both sealing towards the exterior of the passages for the shafts and, in closed position of the butterfly, the continuity of the sealing, upstream and downstream, of the butterfly on the seat, said valve further comprising around each of said shafts, an annular element of triangular cross-section, a bearing for said shaft having a tapered face in contact with one of the faces of said annular element, a washer having a tapered face in contact with the other face of said annular element, spring means acting on said bearing to urge the same against said annular element, said body having a shoulder against which said washer bears under the action of said spring means transmitted through the annular element, said shoulder being at the level of the upper face of the cuff portion of the support, said cuff portion of said seat extending into sealing contact with said annular member to form a second seat thereat.

3,991,975
ROTARY PLUG VALVE WITH NOTCHED SEALING RING GROOVE

Joseph S. Sibrava, Berwyn, Ill., assignor to Mueller Co., Decatur, Ill.

Filed July 8, 1975, Ser. No. 593,982
Int. Cl.² F16K *5/04*
U.S. Cl. 251—317 **22 Claims**



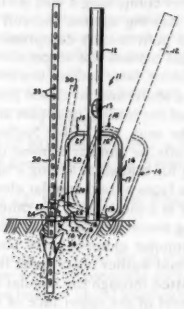
14. A rotary plug valve comprising:

a housing member having a valve seat provided with at least a first port and a second port, a plug member having a flow passage therethrough, said plug member being rotatable in said valve seat to align the passage therethrough with said ports in a fully opened positiion and move said passage out of alignment with said ports in a closed position, said plug member having an endless groove on its surface with an endless sealing ring therein, said sealing ring being arranged to encircle and form a seal around one of said ports in said housing member when said plug member is in the closed position, said groove having an inner wall, an outer wall, and a bottom wall, at least a segment of said groove with said sealing ring therein being movable across at least one of said ports when said plug member is rotated between opened and closed positions, said segment of said groove having at least one notch in the outer wall of the groove and at least one notch in the inner wall of the groove, each of said notches extending downwardly from the surface of the plug member.

3,991,976
IMPLEMENT FOR DRIVING AND REMOVING FENCE POSTS

Warren Skinner, 520 Delphi, Sheridan, Wyo. 82801

Filed Sept. 2, 1975, Ser. No. 609,690
Int. Cl.² E21B *19/00*
U.S. Cl. 254—30 **4 Claims**



1. An implement for driving posts into and pulling them from the ground comprising, in combination,

an elongate post driving member,

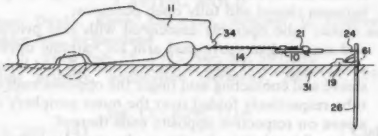
handle means secured to said driving member adjacent one end thereof and by which the member can be reciprocated for driving a post, said handle means including a surface spaced laterally with respect to the axis of said member and operable, when the member is removed from a post and inverted, to engage the surface of the ground adjacent but to one side of said member thereby to provide a fulcrum about which said member can be tilted to a position inclined from the vertical, and

post gripping means connected to and extending laterally with respect to said member at said one end of said member in a direction opposite to said fulcrum surface, said gripping means engageable with the post and operable to apply a lifting force on same in response to the tilting of said member about said fulcrum.

3,991,977
VEHICLE JACK

Wilfred K. Penttila, Guelph, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 14, 1975, Ser. No. 595,856
Int. Cl.² B66F *1/06*
U.S. Cl. 254—71 **3 Claims**



1. A vehicle jack which may be alternately employed for lifting purposes or for pulling a length of chain, with provisions for maintaining the chain in a taut condition when resetting the chain in engagement with the tension grip member of the jack, comprising

a jack bar fitted with a tension grip member in the form of a lift hook mounted on a drive collar that may be manually operated to move, in rachet fashion, in the axial direction of the jack bar,

a hollow sleeve fixed to the jack bar adjacent the bottom end of the jack bar,

a length of chain of a size to fit through said hollow sleeve, with

detachable means to anchor a chain link of said chain to the sleeve or a chain link of said chain to the lift hook,

said jack bar fitted with tension fastening means attachable to the top end of the jack bar, with

a removable platform attachable to the bottom end of the jack bar which can be employed as a base against which the bottom end of the jack bar may be mounted for use in lifting said platform formed with a through hole, together with

a stake of a size to fit through said hole in the removable platform, which stake may be fastened through said hole to fix said platform in position, and to alternately serve as an anchor support means when the jack unit is employed to pull the length of chain.

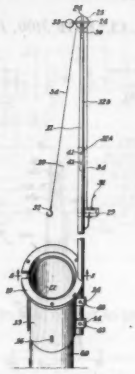
3,991,978
SUBMERSIBLE PUMP BOOM

William Jones, Mount Kisco, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 17, 1975, Ser. No. 558,849
Int. Cl.² B66C *23/60*
U.S. Cl. 254—139 **3 Claims**

1. A boom unit for use in lifting or lowering a submersible pump and attached piping in a well through a well casing to which the boom unit is fastened, comprising

an extendable multi-sectional telescopic rod member joined to the external side of a hollow base sleeve, said base sleeve being a cylindrical column which substantially surrounds said well casing and is fitted with means to detachably support said sleeve on said well casing



whereby in the operative position the base sleeve is supported solely by said well casing, with

a winch mounted on the rod member and a freely rotating pulley mounted on the free end of the rod member, said rod member being extendably parallel to the axis of the bore of the said sleeve.

3,991,979

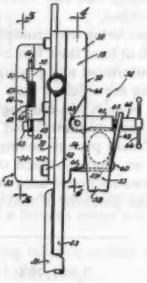
SAFETY LOCK FOR A HOISTING MECHANISM THAT ASCENDS AND DESCENDS A CABLE

William E. Mauldin, Cincinnati, Ohio, assignor to Hi-Lo Powered Stirrups, Inc., Cincinnati, Ohio

Division of Ser. No. 540,838, Jan. 14, 1975. This application Oct. 30, 1975, Ser. No. 626,971

Int. Cl.² B66D *1/00*

U.S. Cl. 254—186 R **1 Claim**



1. A fastener device for a hand drill type power unit on a hoisting mechanism that ascends and descends a cable, said hoisting mechanism including a frame structure to which said hand drill is secured in operational relation, said fastener device including

a hook shaped plate fixed to said frame structure, said plate being positioned so that the hand grip bar of said drill may overlie said hook shaped plate,

a securing mechanism adapted to cooperate with said hook shaped plate to restrain said hand drill against said frame structure, said securing mechanism including a threaded coupling pivotally connected to said frame structure and adapted to overlie said hand grip bar on the other side thereof from said hook shaped plate,

a handle member threadedly engaged with said coupling, and

a trap plate interposed between said handle member and said coupling, said trap plate being sized to interconnect with said hook plate when said coupling is positioned to overlie the hand grip bar, said trap plate forcing said hand grip bar against said frame structure when said handle is threaded into said coupling, thereby aiding in restraint of said hand drill in the desired operational position on said frame structure.

3,991,980

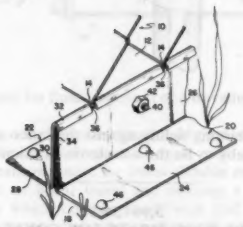
FENCE BORDER GUARD

Edward Blackburn, Homestead, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 19, 1976, Ser. No. 671,312

Int. Cl.² B21F *27/00*

U.S. Cl. 256—45 **6 Claims**



1. A fence guard for a wire link fence comprising:

a first angle guard adapted to be mounted along the ground on one side of said fence, said first base plate and a first substantially vertical side;

a second angle guard adapted to be mounted along the ground on the opposite side of said fence, said second angle guard including a second base plate and a second substantially vertical side, said second side having a bent portion at the upper end adapted to extend through openings in said fence and overlap the upper edge of said first side, said bent portion including a plurality of shots spaced along the length of said second guard and adapted to accommodate the wire links in said fence; and

means for securing said first and second angle guards together about the sides of said fence.

3,991,981

BALUSTRADE WITH ADJUSTABLE SUPPORTING BALUSTERS

Sin An Wu, 228, Sec. 3, Pa-Te Road, Taipei, China /Taiwan

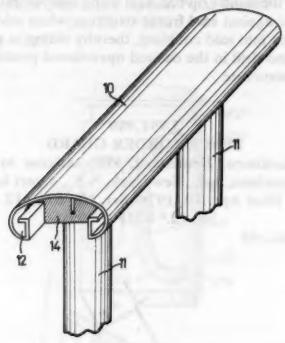
Filed Aug. 11, 1975, Ser. No. 603,775

Int. Cl.² E04H *17/14*

U.S. Cl. 256—65 **1 Claim**

1. A balustrade comprising: an elongated hand rail having longitudinal guide grooves formed therein; a plurality of connectors made up of resilient material and slidably engaged in said grooves; and a plurality of supporting balusters detachably connected to the hand rail through said connectors, characterized in that a plurality of arms are provided on the resilient connectors and protrude laterally therefrom toward the inner surface of the hand rail, a slit is provided on the surface of the connector to increase the resilience thereof, and a recess having a threaded taper wall is provided at the bottom of each connector for receiving the threaded end of the baluster so that when the baluster is loosely screwed in the recess of the connector the latter is slidable in the guide grooves to any desirable position, and when the baluster is loosely screwed in the recess of the connector the latter is slidable in the guide grooves to any desirable position, and when the baluster is further screwed into the tapered recess by some

external force the connector is forced to expand toward the inner surface of the hand rail with said laterally protruded



arms thereof abutting tightly against the inner surface of the hand rail whereby to fix the baluster in position.

3,991,982

BALUSTRADE WITH MEANS FOR CONNECTION OF BALUSTERS TO A RAIL

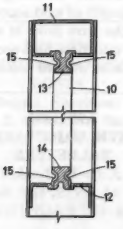
Yukio Yamamoto, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Sept. 9, 1974, Ser. No. 504,352

Claims priority, application Japan, Sept. 14, 1973, 48-107928[U]

Int. Cl.² E04H *17/14*

U.S. Cl. 256—65 **5 Claims**



1. In a balustrade including at least a series of balusters and a top rail, the combination therewith of a pair of jaws extending upwardly from one end of each of said balusters, and a retainer ridge formed longitudinally on the lower surface of said top rail for connection of said balusters to the latter, said retainer ridge including a plurality of transversely registered pairs of recesses formed therein at predetermined longitudinal spacings engaging the basal end portions of the respective jaws of said balusters, a first pair of grooves formed longitudinally in both lateral surfaces of said retainer ridge engaging the mid-portions of the respective jaws of said balusters which project inwardly, and a second pair of grooves formed longitudinally in the lower surface of said top rail on both sides of said retainer ridge engaging the tips of the respective jaws of said balusters.

3,991,983

BLENDER

Anthony Augustus Drynan, P.O. Box 52, Rivonia 2128, South Africa

Filed Aug. 5, 1974, Ser. No. 495,062

Claims priority, application South Africa, Aug. 17, 1973, 73/5688

Int. Cl.² B01F *3/00, 11/00*

U.S. Cl. 259—182 **6 Claims**

1. A hand held and operated blender for use in blending a medium comprising

an elongate generally cone shaped tubular body portion and a prong portion tapering outwardly from a first body portion end to a second free prong end,

said prong portion comprising a plurality of resilient prongs uniformly spaced about and extending from said body portion,

said prongs having at least their free end portions away from said body portion spaced uniformly from each other,

such that said prongs flex and vibrate during use in a medium being blended,

said prongs further being trapezoidally shaped in transverse cross-section in at least their free end portions with longer parallel side outermost and having sharpened side zones extending along the sides of their free end portions, said sharpend side edge zones tending to penetrate lumps or obstructions in the medium being blended,

at least some of said prongs having prong portions being connected at an angle to each other and gradually increasing in cross-sectional area from said free end to a maximum at the juncture of said prong portions.

3,991,984

ELASTOMER PROCESSING APPARATUS

John P. Porter, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

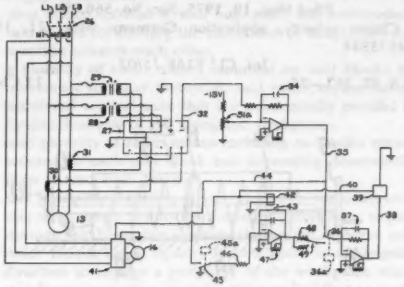
Division of Ser. No. 307,583, Nov. 17, 1972, abandoned. This application Nov. 20, 1974, Ser. No. 525,461

Int. Cl.² B29B *1/10;* **G01R** *7/02, 11/32*

U.S. Cl. 259—195 **6 Claims**

1. An apparatus for processing elastomer including an electrical motor, means driven by said motor for mechanically working the elastomer, means responsive to the flow of electrical power to said motor to provide a continuing electrical signal indicative of the amount of said power consumed by the motor, means to compensate said signal for the power consumed by said apparatus when running empty, means to integrate the compensated signal with respect to time to thereby

provide an electrical output representative of the energy consumed by the drive of said apparatus in working the elastomer,



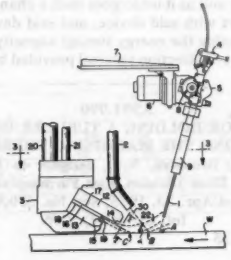
and means responsive to said output to provide a visual representation thereof.

3,991,985

APPARATUS FOR MAKING AN INSTANTANEOUS SCARFING START

Stephen August Engel, Shenorock, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 13, 1975, Ser. No. 540,457
Int. Cl.² B23K *7/06*
U.S. Cl. 266—51 **12 Claims**



1. Apparatus for making an instantaneous thermo-chemical start on the surface of a ferrous metal workpiece comprising in combination:

a. means for producing relative motion between said apparatus and said workpiece,

b. means for feeding wire and for contacting a preselected spot on said surface with the end of said wire,

c. means for heating the end of said wire to its oxygen ignition temperature,

d. blowpipe means, for discharging a high intensity jet of oxygen gas, directed (1) such that the central axis thereof strikes a point on said surface located about 1–15 cm. behind said spot relative to the direction of travel, (2) such that the included angle formed by said axis and said surface is between 30° and 80°, and (3) from a position behind or on the side of said point, and

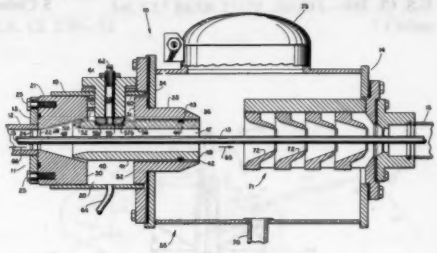
e. nozzle means for providing a stream of scarfing oxygen gas, directed at said surface at an acute angle to said surface such that the oxygen stream discharged from said nozzle strikes the surface slightly behind said point relative to the direction of travel.

3,991,986

FLUID QUENCH HOUSING ASSEMBLY WITH EXTERNAL FLOW ADJUSTMENT

George C. Ward, Carrollton, Ga., and William Gernetzke, deceased, assignors to Southwire Company, Carrollton, Ga.

Filed Jan. 27, 1975, Ser. No. 544,277
Int. Cl.² C21D *9/52*
U.S. Cl. 266—112 **8 Claims**



1. Apparatus for fluid treatment of a traveling rod, comprising:

first means defining an enclosed fluid treatment passageway for the linear travel of an elongate rod;

second means mounted for linear slidable movement along the path of linear travel and defining a fluid injection aperture which communicates with said passageway in annular surrounding relation therewith; and

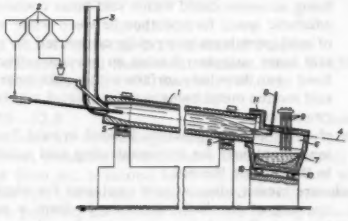
third means engaging said second means and operable from outside of said enclosed passageway to slide said second means along said path of linear travel so as to vary the longitudinal extent of said annular injection aperture.

3,991,987

ROTARY KILN AND HEARTH FURNACE

Kurt Stift, and Helwig Vacek, both of Leoben, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Feb. 19, 1975, Ser. No. 551,014
Claims priority, application Austria, Feb. 22, 1974, 1472/74
Int. Cl.² C21C *5/50*; **F27B** *7/02*
U.S. Cl. 266—163 **4 Claims**



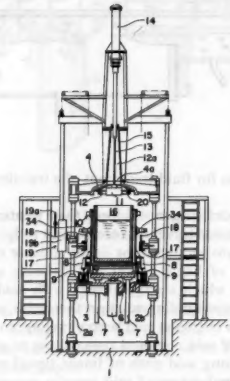
1. A furnace construction comprising: an inclined rotary kiln mounted for rotation about its longitudinal axis, said kiln defining an elongated furnace chamber and having an upper end for receiving material to be heated in the chamber and a lower end from which the material is discharged from the chamber by sliding movement, upon rotation of the kiln; a hearth furnace having a furnace chamber; a joint between the lower end of the kiln and the hearth furnace, the lower end of the kiln passing through the joint and into a part of the hearth furnace so that the kiln chamber opens into the hearth chamber to discharge material directly into the hearth chamber; and means mounting the hearth furnace for tilting movement, independent of rotation of the kiln, about an axis of rotation which is the same as the axis of rotation of the kiln.

3,991,988

APPARATUS FOR MIXING DIFFERENT KINDS OF METALLIC MATERIAL

Teiichi Kawai, Suita, Japan, assignor to Kubota, Ltd., Osaka, Japan

Filed Sept. 30, 1975, Ser. No. 618,265
Claims priority, application Japan, May 12, 1975, 50-56400
Int. Cl.² C21C 1/10
U.S. Cl. 266—216 5 Claims



1. An apparatus for introducing a metallic additive into molten metal having a temperature higher than the boiling point of said metallic additive, which comprises:

a double-walled ladle structure comprising inner and outer containers each having a radially outwardly extending flange at the top of said container, said inner container being accommodated within said outer container with an adiabatic space formed therebetween while said flanges of said containers are rigidly connected to each other, said inner container having an interior refractory lining lined over the whole surface within said inner container, said molten metal being accommodated within said inner container;

a plurality of vent passages formed in said flange in said inner container for communicating said adiabatic space to the outside thereof;

closure means adjacent said container for closing the top opening of the ladle structure to form a substantially hermetically sealed working chamber above the surface level of said molten metal within said inner container, said closure means when held in position to close said top opening of said ladle structure overhanging said vent passages to permit said adiabatic space to be in communication with said working chamber therethrough;

means connected to said closure means for bringing said closure means to the top opening of said ladle structure to close the latter thereby providing said substantially hermetically sealed working chamber; and

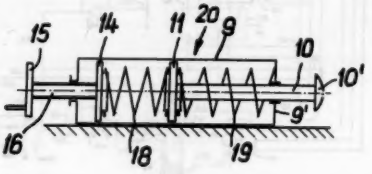
means for introducing said metallic additive, which is accommodated in a refractory container operatively carried by said closure means, into said molten metal when said closure means is in position to close said top opening of said ladle structure.

3,991,989

MOVEMENT DIRECTION REVERSAL DEVICE

Curt Brandis, Totensen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Mar. 19, 1975, Ser. No. 560,084
Claims priority, application Germany, Mar. 21, 1974, 24135544
Int. Cl.² F16F 15/02
U.S. Cl. 267—75 12 Claims



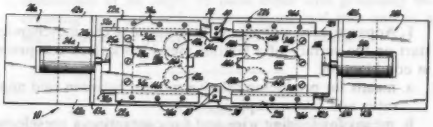
1. A device for reversing the direction of movement of a unit which undergoes back and forth movements over a travel path with abrupt direction reversals at the end points of its travel path, the device including a first member constituting a housing, a second member constituting an abutment rod mounted for movement relative to the housing in a direction between opposed ends of the housing, support means holding one of the members stationary, the older member being arranged to be impacted by the unit at the commencement of such direction reversal, and means establishing a resilient connection between one end of the housing and the rod to influence the characteristics of the relative movement therebetween, the improvement wherein said means establishing a resilient connection gives said device a total potential energy storage capacity approximately equal to the kinetic energy given up by the unit as it undergoes such a change in direction while in contact with said device, and said device comprises means for adjusting the energy storage capacity and the location of the point of direction reversal provided by said device.

3,991,990

FIXTURE FOR HOLDING A TUBULAR WORKPIECE DURING THE MACHINING THEREOF

Sami Shemtov, Brooklyn, N.Y., assignor to I-T-E Imperial Corporation Efcor Division, East Farmingdale, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,819
Int. Cl.² B23Q 3/06
U.S. Cl. 269—25 5 Claims



1. A fixture for engaging an elongated, tubular workpiece that is mounted on a mandrel of a machining apparatus during machining of a portion of the workpiece, said fixture comprising

a. a base plate adapted to be mounted above the machining apparatus;

b. a pair of movable, spacedly opposed blocks positioned on and horizontally movable relative to said base plate;

c. guide means for guiding said blocks during the horizontal movement thereof, said guide means including two pairs of laterally spaced apart rails secured to said base plate, said rails in each said pair being in opposition to each other to allow one of said blocks to be freely movable between said rails comprising each said pair;

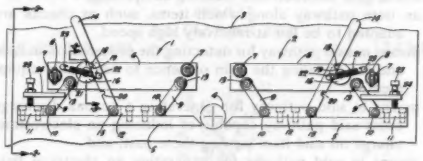
d. each said block including an elongated way on opposite side edges thereof that are parallel to the horizontal movement thereof, said guide means including ribs for engaging said ways;
e. stop means secured to said base plate and intermediate said blocks for limiting the movement of said blocks in a drection towards each other
f. a plurality of roller means mounted on said blocks for movement together therewith, said roller means having rotational vertical axes that are substantially parallel to longitudinal axis of the elongated workpiece;
g. said plurality of roller means including two roller means secured to each said block and depending downwardly from an underside thereof;
h. said base plate including cut-out means for receiving each said roller means and for permitting the workpiece to pass through said base plate for mounting on the mandrel, said roller means being equally spaced apart in an angular direction to engage a periphery of the workpiece when said fixture is positioned above the mandrel that supports the workpiece; and
i. means for displacing said blocks towards the axis of said workpiece for permitting said roller means to tangentially engage the periphery of the workpiece.

3,991,991

QUICK-ADJUSTABLE FENCE UNIT FOR A WOODWORKING TABLE

Waldemar Hammer, 3730 Greencrest Drive, Santa Rosa, Calif. 95403

Filed Oct. 20, 1975, Ser. No. 623,601
Int. Cl.² A61G *13/00*
U.S. Cl. 269—318 **7 Claims**



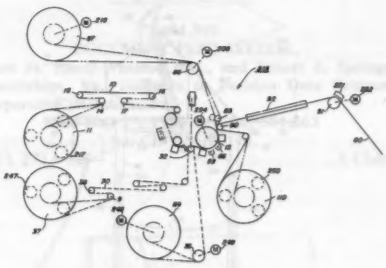
1. A quick-adjustable fence unit, for a woodworking table, comprising an attachment plate on the table, means fixedly securing the attachment plate to the table, a fence extending along the table spaced in front of the attachment plate, spaced parallel links pivotally connected between the attachment plate and fence to provide for movement of said fence between one preselected working position and another preselected working position, fence-positioning instrumentalities between the attachment plate and fence releasably holding the latter in either of said positions but manually operative to release said fence and quick-adjust the same to the other of said positions; said fence-positioning instrumentalities comprising an elongated arm disposed intermediate the links and spanning between the fence and the attachment plate, means securing the forward end of the arm in connected with the fence, and holding means between the attachment plate and the arm operative to normally and selectively, but manually releasably, maintain the arm in either of said working positions.

3,991,992

PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM

John M. Randall, Fairport; Leroy A. Baldwin, Rochester; John M. Schneider, Fairport, all of N.Y., and Allen W. Lee, Richardson, Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,189
Int. Cl.² B65H *25/22, 39/16*
U.S. Cl. 270—52 **7 Claims**



1. A web drive servo control system for controlling the velocity of at least two webs comprising in combination:
a. first servo control means for controlling the advancing velocity of a first web comprising:
i. a first servo motor means for driving the first web at a controlled velocity rate; and
ii. a bi-polar controller for controlling the speed of said first servo motor means so that the first web is driven at a desired linear velocity rate.
b. a second servo control means for controlling the advancing velocity of a second web comprising:
i. a second servo web motor means for driving the second web at a controlled velocity rate; and
ii. a uni-polar controller for controlling the speed of said second motor means so that the second web is driven at a linear velocity rate slightly less than the linear velocity for the first web.

3,991,993

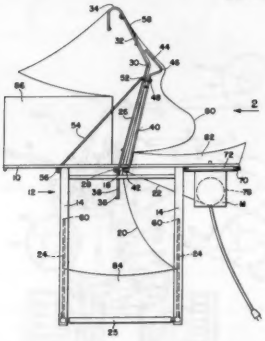
DECOLLATOR FOR CONTINUOUS FORMS

Robert G. Clouthier, 421 Bullard St., Holden, Mass. 01520

Filed May 12, 1975, Ser. No. 576,645
Int. Cl.² B65H *41/00*
U.S. Cl. 270—52.5 **11 Claims**

1. A decollator for decollating a stack of continuous folded manifold forms including in detachably connected layers at least a first form set, a second form set and a carbon web between said first and second form sets, said decollator comprising a first generally horizontal wire rack including a plurality of spaced wires forming a grid-like member, an elongated opening formed generally centrally in said first wire rack, a second wire rack pivotally mounted on said first wire rack, means holding said second wire rack in a vertically inclined position on said first wire rack, a third wire rack pivoted on said first wire rack spaced from and adjacent to said second wire rack and extending upwardly and converging slightly toward said second wire rack, said second and third racks being located respectively on opposite sides of said elongated opening and forming a passage between them to guide said second form set and said carbon web through said elongated opening, said second wire rack having a curved top for guiding said manifold forms over said second wire rack, said third wire rack having an offset upper portion terminating below said curved top of said second wire rack, splitter means on said

second wire rack between the curved top thereof and said offset upper portion of said third rack for separating said first form set from said carbon web and said second form set, means beneath said first wire rack for accumulating said carbon web, and receiver means beneath said first wire rack for receiving said second form set, said first generally horizontal wire rack having first and second support surfaces separated by said second and third wire racks, said first support surface being located adjacent said second wire rack and providing



support for a stack of said continuous folded manifold forms, said second support surface being located adjacent said third wire rack and providing support for a decollated stack of said first form set, said offset upper portion on the third wire rack guiding the decollated first form set to a folded stack on said second support surface, said means for accumulating said carbon web comprising a motor and a rotary core driven by said motor for rolling up the carbon web thereon and traveling said first and second form sets.

3,991,994

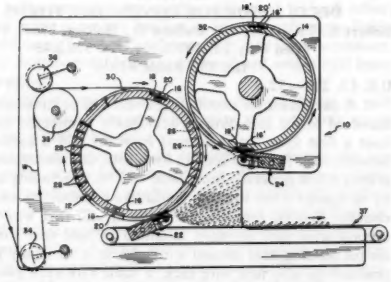
ZIG-ZAG WEB FOLDER APPARATUS

H. Greggs Farish, Salem, Ill., assignor to Wood Industries, Inc., Middlesex, N.J.

Continuation-in-part of Ser. No. 413,176, Nov. 5, 1973, abandoned. This application Apr. 29, 1975, Ser. No. 572,835

Int. Cl.² B65H *45/16*

U.S. Cl. 270—73 **3 Claims**



1. In a web folder having first and second web folding cylinders rotatable in opposite directions to form a bite therebetween through which a web is adapted to extend, a non-rotatable gripping means associated with and spaced from each said cylinder for selectively gripping transversely extending portions of the web to fixedly hold said portions with respect to the periphery of said cylinders, and vacuum means on peripheral portions of each said cylinder for transporting the web around a portion of said first cylinder to be engaged by its associated gripper means and then alternatively around a portion of said second cylinder to be engaged by its associated gripper means whereby a web may be folded in a zig-zag manner; the improvement comprising having a plurality of circumferentially spaced air ports in said first cylinder extending over less than one-quarter of the circumference of said cylinder and circumferentially spaced from said vacuum means, and air flow means separate from said vacuum means for exerting a flow of air through said ports radially outwardly of said first cylinder whereby the portion of a web held relative to the periphery of said cylinder by its associated gripper means will be propelled away therefrom towards folds of the web when the portion is released by the gripper means associated with the first cylinder.

3,991,995

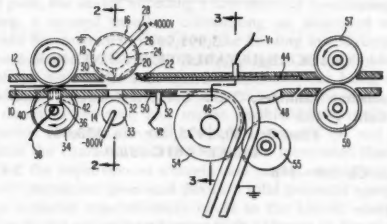
ELECTROSTATIC DOCUMENT HANDLING APPARATUS

Chauchang Su, West Bloomfield, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jan. 5, 1976, Ser. No. 646,557

Int. Cl.² B65H *29/58*

U.S. Cl. 271—64 **8 Claims**



1. High speed document handling apparatus utilizing electrostatic gate selection and stacking comprising,

an item pathway along which items, such as checks are adapted to be fed at relatively high speed,

means in said pathway for detecting the presence of an item and for signaling the item presence to associated equipment,

means in said pathway for generating a corona discharge cross said pathway capable of inducing an electrostatic charge on said item moving there past, and

means in said pathway for generating an electrical field normal to said pathway in response to the signal from said item detecting means effective to interact with said electrostatic charge on said item for deflecting said item out of said pathway and into an item receiving bin or pocket.

3,991,996

STRIPPING AND TRANSFER ROLLER ASSEMBLY FOR SHEET FILM PROCESSING

Larry I. Bass, New Hope, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Jan. 29, 1976, Ser. No. 653,470

Int. Cl.² B65H *29/22, 29/54*

U.S. Cl. 271—80 **2 Claims**

1. A stripping and transfer roller assembly discharging individual sheets of film from a processing machine and comprising

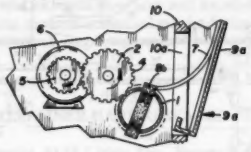
a hollow first roller forming a stripping and transfer roller, said first roller having a plurality of pairs of diametrically opposed openings formed therein in axially spaced relation and lying in an axial plane through said first roller,

a soft compressible stripping and transfer element inserted into said hollow roller through each pair of diametrically opposed openings,

means for retaining said stripping and transfer elements in operative position within said hollow roller with portions thereof normally respectively extending through said pairs of openings beyond the outer periphery of the roller,

a second roller positioned in close parallel relation to said first roller and compressing the outwardly extending portions of said elements when a sheet of film is being driven between said rollers to provide positive frictional driving contact between said sheet and said rollers,

a film receiving bin in close side by side relation to said stripping and transfer roller,



said rollers driving the upper portion of said sheet into the upper portion of said bin to orient said sheet into a substantially upright position,

said elements expanding beyond the periphery of said first roller as they are rotated out of contact with said second roller to strip said sheet from said first roller, and

said expanded elements then being rotated into engagement with the trailing lower edge of said stripped sheet to transfer said trailing edge laterally towards said bin and depositing said sheet in upstanding position into said bin.

3,991,997

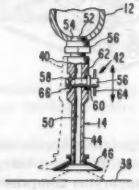
PAPER FEED MECHANISM FOR OFFSET PRINTER

Walter W. Barber, 31830 Trevor Ave., Hayward, Calif. 94544

Continuation of Ser. No. 537,618, Dec. 30, 1974, abandoned, which is a continuation of Ser. No. 409,491, Oct. 25, 1973, abandoned, which is a continuation of Ser. No. 241,636, April 6, 1972, abandoned. This application Jan. 2, 1976, Ser. No. 646,132

Int. Cl.² B65H *3/08*

U.S. Cl. 271—108 **2 Claims**



2. In an offset printer having means for supporting a stack of sheets and a paper feed mechanism provided with a generally horizontal manifold coupled to a source of vacuum and movable with respect to the stack, sheet pick-up means comprising: a tube for communicating with the manifold at a predetermined location thereon with the tube extending downwardly therefrom, said tube having a first, longitudinal bore therethrough and a second bore transverse to and communicating with the first bore, a cylindrical valve member extending through the second bore and being rotatable relative to the tube to control fluid flow through the first bore, the valve member having a flange adjacent to one end thereof, and an O-ring seal between the flange and the tubes and surrounding one end of the second bore, a retainer clip removably coupled to the opposite end of the valve member and operable to hold the flange against the seal and to permit rotation of the valve member relative to the tube, the normally upper end of the tube being externally threaded and movable into threaded engagement with the manifold, and a lock nut threaded on the upper end of the tube and engageable with the manifold when the tube is threadably engaged therewith for adjusting the spacing between the manifold and the lower end of the tube, the lower end of the tube having a resilient suction cup movable into proximity with the uppermost sheet of the stack as the manifold moves in one direction related thereto and when the tube is threadably engaged therewith, whereby the uppermost sheet can adhere by suction to the suction cup and be removed from the stack as the manifold moves away therefrom.

3,991,998

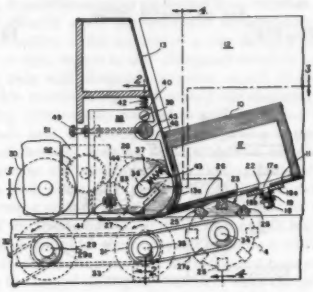
DOCUMENT FEED SYSTEM

Derrald M. Banz, Wheaton, Md., and Robert E. Springer, Woodbridge, Va., assignors to Decision Data Computer Corporation, Horsham, Pa.

Filed May 27, 1975, Ser. No. 581,263

Int. Cl.² B65H *3/46*

U.S. Cl. 271—125 **6 Claims**



5. In a sheet feeding device comprising feed means including a feed roll for serially feeding sheets from a stack, a separator roll disposed adjacent said feed roll and spaced therefrom to form a gap substantially equal to the thickness of a single sheet, said separator roll having a yieldable surface having a relatively high coefficient of friction engageable with the sheets, a roller in contact with the surface of the separator roll for rotatively adjusting said separator roll when the sheets are not in frictional contact therewith to distribute wear over the high friction surface, said roller being angularly displaced from a line extending through the centers of the separator roll and the feed roll, and means mounting said separator roll for shifting movement relatively to the feed roll comprising a guide for constraining the separator roll movement along a path which permits the surface to angularly approach the surface of the feed roll.

3,991,999

REVOLVING STRIPPER FINGER

Edric Raymond Brooke, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 4, 1975, Ser. No. 610,502

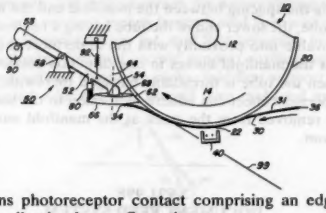
Int. Cl.² B65H *29/54*

U.S. Cl. 271—174 **18 Claims**

1. Apparatus for stripping sheet material from the photoreceptor of an electrostatographic copying machine following electrostatic transfer contact of said sheet material with said machine photoreceptor, comprising, in combination:

a support arm, rotatable tip means and means attaching said

tip means to said support arm adjacent one end of said support arm for contact with said photoreceptor, said tip



means photoreceptor contact comprising an edge of a generally circular configuration.

3,992,000

SHEET STRIPPER

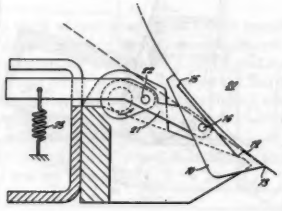
Harvey G. Martin, Royston, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 6, 1975, Ser. No. 619,766

Claims priority, application United Kingdom, Nov. 20, 1974, 50307/74

Int. Cl.² B65H *29/54*

U.S. Cl. 271—174 **19 Claims**



14. In a copier, a sheet stripping device for stripping copy sheets from an arcuate imaging surface; said stripping device comprising a support element and a stripping element with a stripping leading end, said stripping element having spaced apart bearing surfaces for bearing said stripping element against said arcuate surface, said bearing surfaces being located adjacent the leading and trailing ends of said stripping element; said stripping element being freely pivotably connected to said support element at a pivot point located on said stripping element centrally between said bearing surfaces; said support element being mounted to urge said stripping element towards said arcuate surface; said first pivot point being located adjacent said arcuate surface, and said stripping leading end being held out of contact with, but in close juxtaposition with, said arcuate surface by said bearing surface located adjacent the leading end of said stripping element when said bearing surfaces are bearing against said arcuate surface.

3,992,001

SHEET HANDLING APPARATUS

Merrill D. Martin, No. 2 Mall Court, Oakland, Calif. 94611

Filed July 7, 1975, Ser. No. 593,367

Int. Cl.² B65H *29/58*

U.S. Cl. 271—184 **16 Claims**

7. An adjustable back-up device for aligning sheets discharged on a take-off conveyor,

a frame for the take-off conveyor,

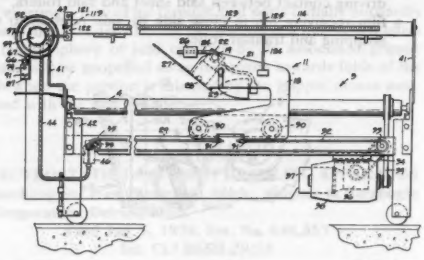
abutment support means on the frame on the conveyor,

abutment means on said support means positioned to stop the transverse movement of the sheets delivered on said conveyor thereby to align the edges of the sheets on the take-off conveyor,

a snubber frame above the discharge end of the take-off conveyor,

snubber means on said frame including snubber rollers bearing on the sheets being discharged from said take-off conveyor,

an element on said snubber frame extended across said conveyor adjacent one of said abutment support means,



said element having indicia thereon corresponding to the width of the sheets conveyed by said conveyor,

coacting means on said adjacent support means and on said element for indicating on said indicia the width of the sheets to which said back-up device is adjusted.

3,992,002

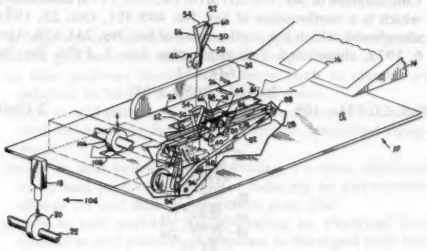
SHEET REGISTERING APPARATUS

Arnold Fassman, Westport, and Robert E. Mersereau, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 18, 1975, Ser. No. 550,284

Int. Cl.² B65H *31/33*

U.S. Cl. 271—221 **11 Claims**



1. Apparatus for registering sheets into a uniform stack preparatory to a working operation being performed on the registered stack, said apparatus comprising:

a. sheet support means defining a substantially flat surface adapted to receive sheets thereon and an elongate aperture extending therealong;

b. abutment means located adjacent one of said sheet support means against which sheets on said surface are to be registered;

c. sheet jogging means extending through said aperture and located along said sheet support means in predetermined spaced relationship from said abutment means and operable to engage the edges of sheets deposited on said surface opposite the edges of the sheets adjacent said abutment means for registering the sheets with said abutment means;

d. mounting means located beneath said sheet support means for mounting said jogging means for movement along said sheet support means within predetermined limits whereby the spaced relationship between said jogging means and said abutment means can be adjusted to accomodate sheets of varying length,

e. driving means located beneath said sheet support means and coupled to said jogging means for operating said jogging means, said driving means being mounted in a fixed position with respect to said sheet support means and including means continuously coupled to said jogging means in driving engagement therewith in any position of said jogging means along said sheet support means for operating said jogging means while in any position, and

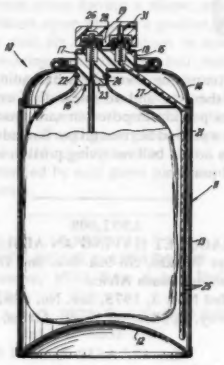
f. locking means operatively associated with said mounting means for locking said mounting means and said jogging means in any predetermined position along said sheet support means, said locking means being accessible through said elongate aperture and located upstream of said jogging means for manual manipulation thereof from above said sheet support means.

3,992,003

AEROSOL CONTAINER HAVING SEALED PROPELLANT MEANS

Marco P. Visceglia, 6118 Liebig Ave., Bronx, N.Y. 10471, and Trevor Wisdom, 41 University Place, Glen Head, N.Y. 11545

Filed Oct. 24, 1975, Ser. No. 625,684
Int. Cl.² B65D *35/28*
U.S. Cl. 272—94 **9 Claims**



1. An aerosol container comprising:

a sealed container having a valve mounting at one end thereof,

at least one flexible bag located within the container and joined to said valve mounting to receive a pressurized substance therein,

a first valve means located in said valve mounting and having a passage extending downwardly into the flexible bag for filling with propellant and second valve means located in said valve mounting and having a passage extending into the container body to permit loading of a second substance therein,

a perforated dispensing tube coupled to the passage of the second valve means, said tube extending downwardly at an angle from the valve passage to the container wall and then, substantially parallel to the wall of the container, and,

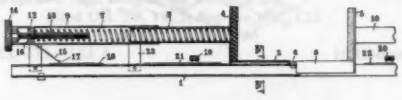
an actuator cap resiliently coupled to the second valve means and having passages therethrough to emit a substance from said valve means and including a cut out portion extending about the first valve means for protection purposes and including a downwardly extending portion to limit the movement of the cap against the container.

3,992,004

SPRING BIASED THIGH AND PELVIC MUSCLE TONING APPARATUS

André Feron, 15 rue Jean Mermoz, 75008 Paris, France, and Claude Bochurberg, 22-bis rue de La Reunion, 75020 Paris, France

Filed Dec. 30, 1974, Ser. No. 537,412
Claims priority, application France, Jan. 8, 1974, 74.00562
Int. Cl.² A63B *21/00*
U.S. Cl. 272—141 **4 Claims**



1. Apparatus for improving the musculature of the thighs and pelvis by simultaneously divaricating the two legs of the previously stretched-out user lying on the floor, in opposition to a force constantly urging the legs towards each other, comprising, in combination an elongated base member adapted to be laid directly upon the floor and to constitute the lower frame structure of the apparatus, a user being postionable on a floor at right angles to said elongated member with his legs passing over said elongated member, a pair of spaced apart collapsible members rigidly mounted and disposed above and extending substantially parallel to said elongated base member, each said collapsible member having a pressure pad mounted thereon, each of said collapsible members having spring means mounted therein for biasing said pressure pads towards each other, stop means for limiting the movement of said pressure pads towards each other while under the biasing force of the spring means, so that a user can fit his or her two knees, feet or ankles therebetween in contact with said pressure pads, abutment means on the elongated base member for limiting the lateral sliding movement of each one of said pressure pads with respect to the elongated base member, and each said spring means having an adjustment means for varying the biasing force of the spring means.

3,992,005

BILLIARD BALL RACK

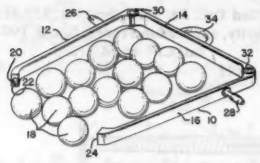
John N. Richey, 22845 Calvert St., Woodland Hills, Calif. 91364

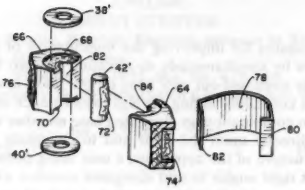
Continuation-in-part of Ser. No. 518,613, Oct. 29, 1974, abandoned. This application Oct. 22, 1975, Ser. No. 624,522
Int. Cl.² A63D *15/00*
U.S. Cl. 273—22 **3 Claims**

1. A billiard ball rack comprising:

a first elongated arm, a second elongated arm, and a third elongated arm interconnected together by connection means to form a triangle shape, said connection means comprises first means hingedly connecting together said first arm and said second arm and said second means hingedly connecting together said second arm to said third arm, said first means is similar in construction to said second means, said first means includes a first groove formed within said first arm and a second groove formed within said second arm, a dowel pin secured to said first groove and located there within, a first washer secured to said second arm adjacent one end of said second groove, a second washer secured to said second arm adjacent the other end of said second groove, said dowel pin to extend through said first and second members and be pivotable in respect thereto, with said dowel pin extending through said washers said dowel pin is positioned within said second groove and the ends of said first arm and said second arm are spaced from each other forming a gap, whereby, said first arm is pivotable in respect to said

second arm due to the pivoting motion between said dowel pin and said washers and the width of said gap





determines the amount of pivoting movement with the greater the width the greater the amount of pivoting.

3,992,006

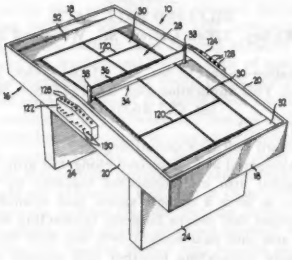
COMPETITIVE BALL GAME APPARATUS

Gordon A. Barlow, Skokie, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Mar. 18, 1975, Ser. No. 559,528

Int. Cl.² A63F 7/06

U.S. Cl. 273—85 F **16 Claims**



1. A game apparatus, comprising:

a frame having opposed playing areas thereon, said playing areas sloping downwardly away from one another;

means defining a generally upstanding barrier between the opposed playing areas;

a substantially hard ball movable upon the playing areas;

means at the lowermost end of each playing area to detect a ball out of play and thereby indicate a point score; and

a hand manipulatable projecting device for each player of the game, said projecting device having means for receiving a rolling ball from the surface of the playing area and projecting the ball through a vertical arc over the barrier to the opposite playing area.

3,992,007

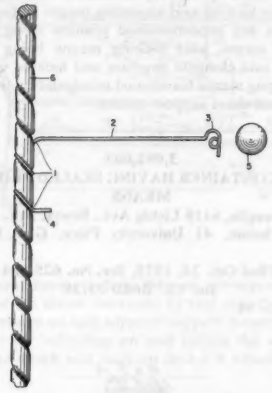
SINGLE SPRING WIRE PLAYING BALL MECHANISM

Alex Seeman, Steuben Road, R.D. No. 3, Peekskill, N.Y. 10566

Filed June 9, 1975, Ser. No. 585,188

Int. Cl.² A63B 71/02

U.S. Cl. 273—95 A **6 Claims**



1. A game comprising a vertically extending pole having a helical groove thereon, and an integrally formed spring wire having a helical portion disposed in said groove, a first horizontal portion, a second horizontal portion adapted to actuate an alarm, and a coiled ball receiving portion at an end of said first horizontal portion.

3,992,008

PLAYING RACQUET HAVING AN ADJUSTABLE NET

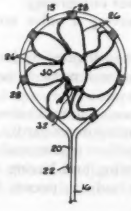
Matthew Madys Watkin, c/o 9th Ave. and Homestead Road, Rivonia, Sandton, South Africa

Filed Nov. 3, 1975, Ser. No. 628,337

Claims priority, application South Africa, Nov. 11, 1974, 74/7214

Int. Cl.² A63B 71/00

U.S. Cl. 273—96 R **2 Claims**



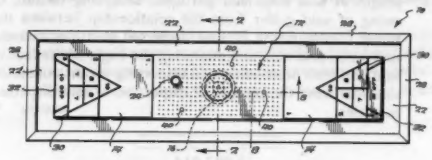
1. Playing equipment comprising a racquet including a length of sturdy tubular material shaped into a shaft, a handle at one end of the shaft and an annular head at the other end of the shaft, a loose net secured to the head to extend across the opening defined in the head and forming an adjustable concave ball-receiving playing web in which a ball which is smaller than the opening defined in the head is receivable, said net comprising flexible string-like elements looped between the head and a central noose which is also a flexible string-like element.

3,992,009

AIR CUSHION GAME

Nicholas D. Trbovich, 28 Tanglewood Drive West, Orchard Park, N.Y. 14127

Filed Feb. 3, 1975, Ser. No. 546,719
Int. Cl.² A63F *7/00*
U.S. Cl. 273—126 R **12 Claims**



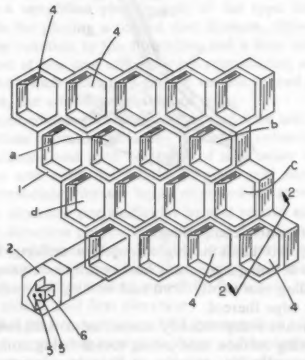
1. An air cushioned game comprising in combination,
an air bed means, said air bed means including a powered air source means, an upper, substantially horizontal surface and holes in at least a portion of said surface, said air source means discharging air upwardly through said holes in said surface of said air bed means,
at least one scoring area being substantially coplanar with said air bed means so that a playing area is formed by said air bed means and said scoring area, said playing area including imperforate portions,
at least one game piece having a shape, area and weight such that it floats upon at least a portion of said air bed means when said air source means is activated and is capable of moving over said air bed means generally without touching it, but wherein said game piece frictionally slides over said imperforate portions of said playing area in substantial contact therewith so that the translational movement of said game piece is retarded, and
scoring means in said scoring area so that a player's score may be determined by said game piece coming to rest in said scoring area.

3,992,010

PATH PUZZLE APPARATUS

Wallace O. Mattenson, 1732 Rose Arbor Drive, St. Louis County, Mo. 63141

Filed Apr. 7, 1975, Ser. No. 565,649
Int. Cl.² A63F *3/00*
U.S. Cl. 273—130 R **2 Claims**



1. A path puzzle apparatus comprising,
playing board provided with a plurality of hexagonally shaped apertures arrayed therein in combination with,
a plurality of hexagonally shaped pieces for placement in said apertures,
an arrow shaped direction indicating structure operably mounted on each of said pieces, said arrow disposed in a direction perpendicular to a side of said hexagon,
travel distance indicia comprising a plurality of dots operably mounted on each of said arrow shaped indicating structures and disposed in alignment with said arrow.

3,992,011

HEADS DOWN GOLF PRACTICE DEVICE

Karl E. Jessee, Huntington Beach, Calif., assignor to Active Enterprises, Inc., Huntington Beach, Calif.

Filed Oct. 30, 1975, Ser. No. 627,122
Int. Cl.² A63B *69/36*
U.S. Cl. 273—183 A **10 Claims**

9. A golf practicing device comprising in combination:
a. a base including an upper surface and a lower surface and a peripheral edge;
b. a resilient tee member having a lower end fixedly attached to said base, an opaque wall extending upwardly from said lower end to a top end disposed above the base for teeing a golf ball thereon, said opaque wall defining therewithin a light transmitting interior having a light exit at the top thereof and a light entrance at the lower end thereof;
c. a light bulb mounted in said base in alignment with said light entrance for emitting light upwardly through the interior of said tee and out through said light exit, an electrical energy source means, and electrical wiring means for conducting electrical energy from said energy source means to said light bulb to cause the latter to emit light to the interior of said tee, which light is visible to the golfer when a ball is not present on said tee member,
d. a wheel having a plurality of transparent lenses of varying colors concentrically spaced around said wheel,
e. means for mounting said wheel for rotation in said base whereby said wheel can be rotatably indexed to sequentially align each lens with said light bulb and the interior of said tee, and
f. means for releasably retaining said wheel in each indexed position,
whereby a golfer can first position a ball on said tee, thereafter index said wheel to present a lens of unknown color to a position above said light bulb, briefly glimpse the colored light as the ball is struck from the tee, and re-observe such colored light at the completion of his swing.

3,992,012

ELECTRICAL GOLF CLUB SWING MONITOR

Ian R. Campbell, 3 Goswell Ave., Islington, Ontario, Canada (M9A IG2)

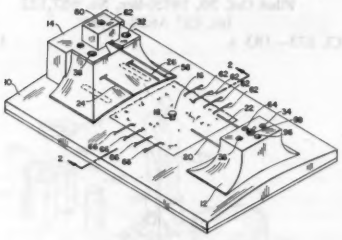
Filed Oct. 20, 1975, Ser. No. 623,945
Int. Cl.² A63B *69/36*
U.S. Cl. 273—186 R **6 Claims**

1. A device for recording the deviation of travel of a golf club head from a desired path, the device having a base and said base having a ball support area, and the device having deviation detectors above said base with their free ends adjacent said ball support area for contact by a club head as it passes over said ball support area of said base in a swing with

more than a predetermined amount of deviation, wherein said detectors comprise:

laterally extending resilient whiskers flexible to the passage of a club head thereacross, the whiskers being supported at their fixed ends with respect to the base and having their free ends at the edge of said path, there being at least four of said whiskers, two on each side of said path extending generally toward the path;

an electric circuit associated with each of said resilient whiskers and each circuit including a contact engageable



by its respective resilient whisker on flexing, and the circuit being operative upon such engagement to go from a standby to an active condition;

an electric indicator for each of said circuits and operative while said circuit is in an active condition to indicate flexing of the whisker associated therewith; and

timing means in each electric circuit for maintaining it in active condition for a predetermined time after engagement of said contact by said whisker, and then automatically returning the circuit to standby condition.

3,992,013

GOLF CLUB SWING TRAINING METHOD

Steven T. Golden, 822 Teague Drive, Santa Paula, Calif. 93060

Filed June 20, 1975, Ser. No. 588,601

Int. Cl.² A63B *69/36*

U.S. Cl. 273—186 D **4 Claims**

1. A method for analyzing both the depth and arc of swing of a golfer swinging a golf club head over a mat having indicia simulating golf ball thereon and analyzing the angle of the face of the golf club head when contacting said mat comprising the steps of:

dispersing a relatively thin film of relatively soft fine dry pulverized particles of material over the upper surface of said mat;

removably attaching dispersing means adapted to disperse said particles when contacting the same to form at least a pair of spaced paths of dispersed material to the head of said golf club, the overall weight of the club head before attaching the dispersing means thereto being only slightly less than the overall weight of the club head and dispersing means after attachment thereto;

swinging said golf club head over said indicia on said mat;

contacting said mat with said dispersing means thereby dispersing said particles into at least a pair of spaced elongated paths through said material dispersing the same in a pattern on all sides of said tracks;

analyzing the pattern of said dispersed particles to determine the depth of swing of said golfer from the overall length of said dispersed particles, analyzing the arc of swing of said golfer from the relationship between the linear configuration of said dispersed particles and the indicia on said mat, and analyzing the angle of the face of said golf club head when said dispersing means contacted said mat from the pattern of dispersion of said dispersed particles.

3,992,014

MOLDED SOLID GOLF BALL COMPRISING A SILANE FOR GREATER VELOCITY

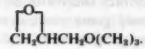
David Thomas Retford, Cincinnati, Ohio, assignor to Brunswick Corporation, Skokie, Ill.

Filed Oct. 22, 1969, Ser. No. 868,349

Int. Cl.² A63B *37/08*; **C08L** *9/00*, *43/04*, *63/00*

U.S. Cl. 273—218 **3 Claims**

1. A homogeneous golf ball comprising a crosslinked rubber polymer in which the rubber polymer is at least about 60% cis-polybutadiene and is crosslinked with 5 to 50 phr of a crosslinking monomer having at least two acrylic groups, from about 1 to about 50 parts by weight solid particulate filler based on rubber polymer and from about 1% to about 10% by weight of a silane having the formulation $R—Si(OCH_3)_3$ wherein R is selected from the class consisting of $HS(CH_2)_3$, $NH_2(CH_2)_3$, $CH_2{=}C(CH_3)\,COO(CH_2)_3$, and



$CH_2CHCH_2O(CH_2)_3$.

3,992,015

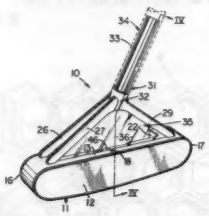
FOUR-PRONG PUTTER HEAD SUPPORT

Glenn S. Benson, 705 N. Studebaker, Mishawaka, Ind. 46544

Filed Jan. 24, 1975, Ser. No. 543,829

Int. Cl.² A63B *53/02*

U.S. Cl. 273—80.2 **9 Claims**



8. A golf putter, comprising:

an elongated head having an upright striking face and means defining a generally horizontally extending surface extending rearwardly from said striking face adjacent an upper edge thereof;

prong means independently connected to said horizontally extending surface, said prong means being connected to said horizontally extending surface at a location spaced rearwardly from said upper edge and being laterally spaced from a theoretical plane extending perpendicularly to said striking face and containing the center of said elongated head;

means defining a support spaced above said horizontally extending surface and adapted to be secured to a handle,

each of said prong means extending between said horizontally extending surface and said support means and being connected at the upper ends to said support means to define a generally triangular-shaped opening therebetween;

generally triangularly-shaped insert means having a size corresponding to the size of said triangular-shaped opening and being received in said triangular-shaped opening; and

securing means for securing said insert against movement relative to said prong means and said elongated head, said prong means providing the only force transmitting structure between said support means and said elongated head means.

3,992,016

SIMPLIFIED PHONOGRAPH

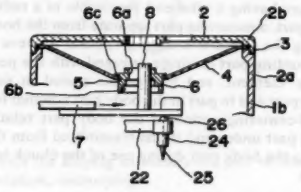
Katsumi Watanabe, Kanagawa, Japan, assignor to Yugen Kaisha Watanabe Kenkyusho, Japan

Filed July 8, 1975, Ser. No. 594,025

Claims priority, application Japan, Apr. 28, 1975, 50-51885

Int. Cl.² G11B *3/02*; **G10K** *13/00, 11/14*; **A63H** *3/33*

U.S. Cl. 274—1 A **5 Claims**



1. In a simplified phonograph of the type comprising a turntable for placing a record disc thereon, drive means for imparting rotation to the turntable, and a tone arm pivotally supported at one end and having a reproducing stylus at the other end which rides in a groove on the record disc on the turntable, the combination thereof with:

an intermediate vibrator overlying said tone arm, said intermediate vibrator including a portion extending along a predetermined path of travel of said other end of said tone arm over the record disc on said turntable said intermediate vibrator being mounted for movement in a first direction perpendicular to said record and in a second direction perpendicular to said first direction;

first spring means for yieldably urging said intermediate vibrator in said first direction against said tone arm;

a vibrator rod extending upwardly from said intermediate vibrator in said first direction;

a diaphragm arranged over said intermediate vibrator, said diaphragm being conical in shape and having at its vertex an aperture adapted to receive said vibrator rod with clearance; and

second spring means for yieldably urging said vibrator rod in said second direction against the edge of said diaphragm bounding said aperture while permitting said vibrator rod to move in its longitudinal direction in sliding contact with said edge of said diaphragm.

3,992,017

PICKUP CARTRIDGE

Yoshihisa Mori, Tokyo; Kazuo Shimura, Hatogaya, and Hiroyuki Watanabe, Fujisawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

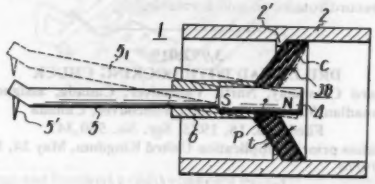
Filed Nov. 22, 1974, Ser. No. 526,388

Claims priority, application Japan, Nov. 23, 1973, 48-135377[U]

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G11B *3/02*; **H04R** *1/16, 11/08*

U.S. Cl. 274—37 **7 Claims**



1. A pickup cartridge comprising:

A. vibrating means comprising a cantilever arm;

B. an elastomeric support and damper member in the form of a centrally apertured member formed as a surface of revolution and comprising two major surfaces, one generally convex and the other generally concave, said vibrating means being supported in the aperture of said member, said member extending outwardly from the axis of said arm to the outer perimeter of said member, whereby said vibrating means pivots about axes that pass transversely through said vibrating means at the region thereof grasped by the perimeter of said aperture, said region being offset to one side of a plane passing through said outer perimeter;

C. a holder for supporting said elastomeric member along said outer perimeter; and

D. fibers extending outwardly from the center of said support member along generatrices thereof providing a greater stiffness in the axial direction of the member than in a direction perpendicular thereto.

3,992,018

METHOD AND APPARATUS FOR USE IN CLEANING A GRAMOPHONE DISC

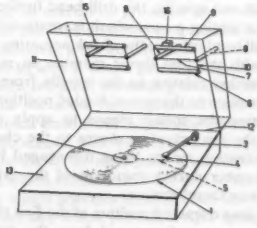
Dexter Robert Plummer, Ongar; Gerald Avison; Colin Howard Stanwell-Smith, both of Victoria Park, and Keith Douglas Ridler, Fulbourn, all of England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Jan. 31, 1975, Ser. No. 546,085

Claims priority, application United Kingdom, Feb. 5, 1974, 5267/74

Int. Cl.² G11B *3/58*

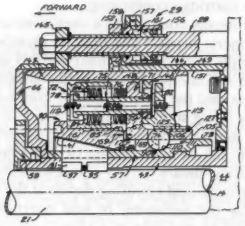
U.S. Cl. 274—47 **3 Claims**



1. In combination:

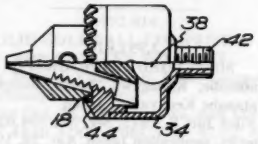
a turntable for receiving and rotating a grooved phonograph record;
a lid for said turntable;
a tone arm mounted on said turntable for tracking the grooves of said record;
a cleaning element; and
means for mounting said cleaning element on said lid for movement between a position out of contact with a record on said turntable and a position wherein said element contacts a constant annular area of the top surface of said record and extends along the surface of said record so as to clean the top surface of said record as said record rotates on said turntable.

3,992,019
DRILL HEAD WITH LOCKING CHUCK
Richard Crawshay, North Vancouver, Canada, assignor to Canadian Mine Services Ltd., Vancouver, Canada
Filed Feb. 18, 1975, Ser. No. 550,347
Claims priority, application United Kingdom, May 24, 1974, 23479/74
Int. Cl.² B23B *31/30, 31/16*
U.S. Cl. 279—4 **19 Claims**



1. A drill head for a core sampling drill, the drill head including an elongated powered spindle with a central axial bore to accept a drill rod, and a drill chuck cooperating with the spindle, the chuck having chuck jaws movable inwards to grip the drill rod for rotation about a drill rod axis, the drill head being characterized by:
a. first detent location means associated with the spindle,
b. a first thrust member movable between jaws retracted and jaws extended positions,
c. detent means movable between jaws retracted and jaws extended positions, the detent means being generally complementary to the detent location means to cooperate with the spindle and the first thrust member to hold the first thrust member in the jaws extended position,
d. pre-compressed chuck spring means cooperating with the first thrust member and jaw actuating means so as to be movable in its entirety with the first thrust member,
the detent location means, the first thrust member, the detent means and the chuck spring means being adapted to rotate with the chuck and spindle, the drill head further including:
e. a chuck actuating means which is rotationally stationary as the drill head rotates, the chuck actuating means cooperating with the first thrust member to move the first thrust member relative to the spindle from the jaws retracted position to the jaws extended position thus further compressing the spring means to apply closing force through the jaw actuating means to the chuck jaws, the chuck actuating means being disengaged from the first thrust member during operation of the drill to prevent interference therebetween.
so that in the jaws retracted position of the first thrust member the detent means are disengaged from the detent location means and the spring means is precompressed and positioned to permit the jaws to retract to permit relatively large diameter tools to pass the chuck jaws, and in the jaws extended position of the first thrust member the detent means engage the detent location means to locate the first thrust member relative to the spindle and the spring means are repositioned with the first thrust member so that the spring means are further compressed to cooperate with the chuck jaws to extend the jaws inwards to grip the drill rod.

3,992,020
DRILL CHUCKS
George Cecil Derbyshire, Sheffield, England, assignor to The Jacobs Manufacturing Company Limited, Sheffield, England
Filed Jan. 30, 1975, Ser. No. 545,596
Int. Cl.² B23B *31/12*
U.S. Cl. 279—16 **13 Claims**



1. A drill chuck including a body part in which jaws are slidably mounted in respective converging guides, a nut rotatably mounted on the body part in an annular groove and having screwthreaded engagement with the jaws, a bevel gear fixed about the nut and adapted to be engaged by the teeth of a chuck key having a pilot end receivable in a radial bore of the body part, a mounting part separate from the body part for connecting the chuck to a driving spindle, a sleeve extension of the mounting part drivingly engaged with the periphery of bevel gear element, and ball means seated in part in the mounting part and in part in the body part adapted for producing a self-centering action of the body part relative to the mounting part under end thrust transmitted from the mounting part to the body part during use of the chuck in a drilling operation.

3,992,021
SKI POLE GRIP
James E. Tobin, Sun Valley, Idaho, assignor to Scott USA, Sun Valley, Idaho
Continuation-in-part of Ser. No. 391,690, Aug. 27, 1973, Pat. No. 3,880,443. This application Jan. 10, 1975, Ser. No. 539,025
The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.
Int. Cl.² A63C *11/22*
U.S. Cl. 280—11.37 H **10 Claims**

1. A strapless ski pole grip, comprising:
an elongated body member with an axial bore for receiving a shaft of a ski pole, the body member having a forward grip section extending radially by a first distance from the axial bore for receiving the fingers of the skier's hand and a rear palm engaging section extending radially by a

second distance substantially greater than the first distance for abutting the palm of the skier's hand to prevent rotation of the elongated body member, and

a resilient side finger extending radially outward from one end of the body member and then axially therefrom to define a side section generally parallel with the axial bore and offset from the elongated body member to form therebetween a channel for containing the skier's hand, the side section being oriented to extend across the back of the skier's hand when grasping the elongated body member and to deflect radially to open the channel and allow release of the skier's hand.

3,992,022
DEVICE FOR TEACHING SKIING

Frederic L. Albers, 35 A Christie St., Ste. Anne DeBellevue, Quebec, Canada

Filed June 6, 1975, Ser. No. 584,590
Int. Cl.² A63C *11/00*
U.S. Cl. 280—11.37 E **8 Claims**

1. A device for helping to maintain a pair of skis in snowplow orientation, comprising:

a. a first means adapted for rigid connection to a first ski and having a shank portion which extends substantially vertically when said first means is connected to the front tip of said first ski and said first ski is on a horizontal surface;

b. a second means adapted for rigid connection to a second ski and having an eyelet portion the plane of which extends substantially horizontally when said second means is connected to the front tip of said second ski and said second ski is on a horizontal surface; and

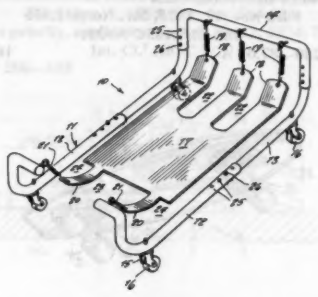
(c) wherein said shank and eyelet are offset in from said first and second means, respectively, a direction toward each other and transverse to said skis when said first and second means are connected to said first and second skis, respectively.

3,992,023
BABY CRAWLER

Donald K. Moorer, 3547 Jonathan Circle, Augusta, Ga. 30906

Filed Apr. 7, 1975, Ser. No. 565,822
Int. Cl.² B62B *11/00*
U.S. Cl. 280—87.02 R **2 Claims**

1. In a baby crawler, the combination of a creeper vehicle of a size intended for carrying a baby, said vehicle including a platform upon which said baby is placed, and wheel means for support thereof in order to move about, said platform comprising a raised seating supported by said frame, said frame being comprised of a plurality of tubular aluminum sections that are telescopically adjustable, said wheel means comprising casters and caster wheels, said seating having extending tabs formed at each opposite ends thereof, with spaces between said extending tabs, terminal ends of said tabs being suspended by tension coil springs from said frame, said spaces each being sufficiently wide for receiving therethrough

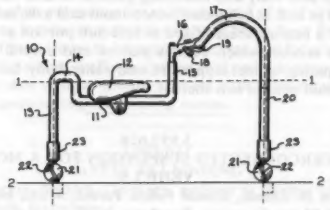


the legs and hands of a child upon said platform for contacting a ground and thus propelling said creeper vehicle.

3,992,024
TRIPODAL VEHICLE

John Workman, 232 E. Oak St., Ovid, Mich. 48866

Filed Nov. 20, 1975, Ser. No. 633,716
Int. Cl.² B62B *7/00*
U.S. Cl. 280—87.02 W **5 Claims**



1. The tripodal vehicle which comprises:

a. a straight bar which supports a seat;

b. said seat, adjustably mounted to said bar;

c. a single leg positioned adjacent and below the seat substantially at a right angle to the bar and having an inverted U-shaped rigid connection to the bar such that uppermost portion of the U is above the uppermost portion of the seat when the vehicle is on a level plane and provides a rigid spring action, wherein the distance between the U and the level plane is less than the length of the users legs to provide ease of mounting;

d. attachment means mounted on the bar on the other side of the seat from the single leg, said attachment means including an extension, provided above the seat at right angles to the bar, attached to a handle bar clamp said clamp clamping a horizontal tubular handle bar between two jaws to lock it into a preferred position, said clamp jaws, when released, permitting rotation of said horizontal handle bar about its longitudinal axis;

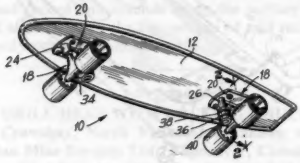
e. a horizontal handle bar adjustably connected to the attachment means with two inverted U-shaped portions which are above the uppermost level of the seat and with two legs which extend below the seat to the level plane to a length which provides seating when the vehicle is on a level plane and which provide a rigid spring action; and

f. casters mounted at the ends of the three legs such that the vehicle is movable by the feet from a rest position in any direction in a level plane when a person is seated on the vehicle.

3,992,025
SKATE BOARD AND WHEELS THEREFOR

Joseph G. Amelio, Reseda, Calif., assignor to Union Plastics West, North Hollywood, Calif.

Filed Nov. 17, 1975, Ser. No. 632,356
Int. Cl.² A63C 17/22
U.S. Cl. 280—87.04 A 16 Claims

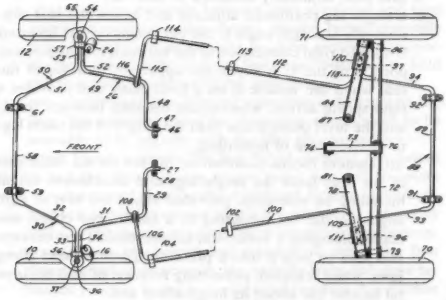


1. For use in a device such as a skateboard, a roller body consisting of a solid piece of resilient plastic material and having opposed ends and extending between said ends an exterior cylindrical surface of circular cross section surrounding a central axis of the roller body, the latter being formed with a central axial bore passing through said body and having an axis coinciding with said central axis, said body having adjacent said bore an interior hub portion, and said body being formed between said central bore and said exterior cylindrical surface with a plurality of cooling bores passing through said body and extending parallel to said central axis thereof as well as being distributed about said axis, and at least part of a bearing means fixed to said hub portion at an inner surface thereof which defines part of said central bore for participating in the support of said roller body for rotation about said central axis thereof.

3,992,026
INTERCONNECTED SUSPENSION FOR A MOTOR VEHICLE

William D. Ailison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,803
Int. Cl.² B60G 11/18
U.S. Cl. 280—104 16 Claims



1. A suspension system for a motor vehicle having a vehicle frame;

left and right front wheels positioned adjacent said frame and rotatably supported by left and right wheel support members;

left and right front torsion bar spring means connected to said vehicle frame and to said left and right wheel support members;

left and right rear wheels rotatably supported by an axle;

left and right suspension arms pivotally connected to said axle;

means connecting said suspension arms to said vehicle frame;

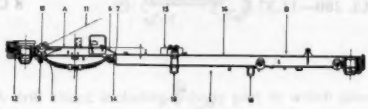
left and right longitudinal torsion bars having forward load lever arms connected to said left and right front torsion bar spring means and rear load lever arms connected to said left and right suspension arms;

said left and right longitudinal torsion bars being connected to said vehicle frame.

3,992,027
RIGID CHASSIS FOR AIR TRANSPORTABLE VEHICLE

Paul Etienne Rene Legueu, 85, avenue de Mazy, 44380 Pornichet, France

Filed Dec. 4, 1974, Ser. No. 529,510
Claims priority, application France, Dec. 7, 1973, 73.43710
Int. Cl.² B62D 21/00
U.S. Cl. 280—106 R 8 Claims

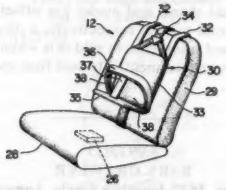


1. In an automotive vehicle chassis including a suspension spring having a front mount and a rear mount, the combination of a pair of longitudinal main frame rails connected by cross members, said suspension spring being connected to the rails at the front mount and rear mount, said rails being vertically offset at the location of the rear mount of the suspension spring by an offset transition zone, said offset transition zone dividing the rails into a front portion and a rear portion, said portions being at different heights said rear mount being affixed to the offset transition zone.

3,992,028
CHILD RESTRAINING SEAT

Fumiyuki Abe, and Shigeo Fukuda, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 1, 1974, Ser. No. 520,341
Claims priority, application Japan, Nov. 6, 1973, 48-124024
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B60R 21/10
U.S. Cl. 280—728 5 Claims



1. In a motor vehicle having an occupant seat and a trigger circuit of an air bag that corresponds to said occupant seat, said trigger circuit including a seating sensor which is energized when an occupant sits on a seat portion of said occupant seat, to shift said trigger circuit into a condition wherein said trigger circuit will inflate said air bag in collision of the motor vehicle, the improvement comprising a child restraining seat provided with means whereby said child restraining seat is detachably hung securely on a back portion of said occupant seat such that said seating sensor is kept deenergized by seating of a child on said child restraining seat, a first gas producer circuited in said trigger circuit in series with said seating sen-

sor and second gas producer circuited in said trigger circuit such that said second gas producer will be actuated in the collision of said seating sensor, said first and second gas producers being constructed and arranged with respect to said air bag such that said air bag will be inflated to its active position when both of said first and second gas producers are actuated, but said air bag will be inflated to such an inflating position to prevent the child seating on said child restraining seat from being injured upon the inflation of said air bag by the second gas producer and from hitting on an inner structure of the motor vehicle.

3,992,029

SKATER TYPE SPORT VEHICLE

Yoshikazu Washizawa, Omiya; Kiyoshi Kume, Saitama; Yasuhiro Ohba, Niiza, and Kazutoshi Otsuka, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 21, 1975, Ser. No. 597,886

Claims priority, application Japan, Sept. 4, 1974, 49-100838

Int. Cl.² B62M *1/04*; B62K *9/00*

U.S. Cl. 280—221 **5 Claims**

1. A sport vehicle comprising a frame having front and rear ends, an upstanding handle on said frame at the front end thereof, a front axle, a pair of spaced front wheels on said front axle, steering means for pivoting said front axle including a steering shaft on said frame supporting said axle at a location intermediate the front wheels for left and right pivotal steering movement, said steering shaft having a negative caster angle, and a resilient member interconnecting the front axle and said frame such that tilting of said frame produces pivotal steering movement of said axle, a rear axle rotatably mounted from said frame at the rear end thereof, a rear support wheel on said rear axle, driving means for driving one of said wheels in rotation by repeated foot action of the operator, said driving means comprising a swingable pedal lever, a drive wheel for said one wheel to be driven in rotation, a flexible member coupled to said pedal lever to be driven in reciprocating movement upon oscillating swinging of said pedal lever and means for transmitting drive rotation force from said drive wheel to the vehicle wheel to be driven in rotation for one direction of movement of said longitudinal member while allowing idle movement in the opposite direction, a support element secured to said frame and rotatably supporting the axle of said one wheel of the vehicle to be driven in rotation, and a connecting rod secured to said support element and to said frame and positioned relative to said pedal lever to serve as a stop member limiting oscillating swinging movement of said pedal lever in two directions.

3,992,030

DEVICE FOR MOUNTING A BRAKE ON A SKI

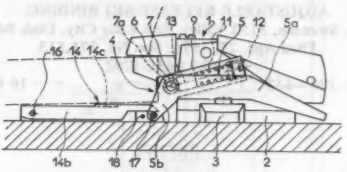
Georges Pierre Joseph Salomon, Annecy, France, assignor to S.A. Etablissements Francois Salomon & Fils, France

Filed Apr. 1, 1975, Ser. No. 563,956

Claims priority, application France, Apr. 2, 1974, 74.11638

Int. Cl.² A63C *7/10*

U.S. Cl. 280—605 **6 Claims**



1. For use with a ski binding having a slide bar extending longitudinally of the ski and mounted in a fixed position in use on the ski, a ski brake comprising a heel plate having coupling means for slidably engaging said slide bar longitudinally of the ski for removably coupling and fixing said ski brake thereon without movement transverse of said slide bar, means on said heel plate to releasably fix said heel plate axially on said slide bar, said heel plate having pivotally mounted thereon at least one brake lever, means on said heel plate pivotally mounting said brake lever, biasing means constantly biasing said brake to an operative position for braking a ski when mounted thereon, pedal means pivotally mounted on a forward end of said heel plate extending toward a rear end of said ski in use and having means cooperative with said brake lever for actuating said brake lever to a retracted position and for rendering said biasing means ineffective when said pedal is pressed in a direction downwardly toward said ski with a predetermined pressure overcoming said biasing means.

3,992,031

SAFETY SKI-BINDING

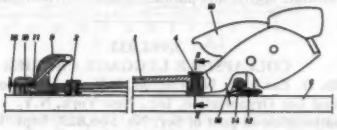
Heinz Korger, Munich, Germany, assignor to Hannes Marker, Garmisch, Germany

Filed Apr. 29, 1975, Ser. No. 572,824

Claims priority, application Germany, May 6, 1974, 2421754

Int. Cl.² A63C *9/081*

U.S. Cl. 280—618 **5 Claims**



1. A safetly ski-binding of the type wherein a sole plate provides a connection between the ski boot and the ski, the sole plate being held to the ski by retaining means including fittings and latching means for releasing the sole plate upon the occurrence of an excessive load in a vertical and/or horizontal direction, the fittings being disposed at a height above the ski for engagement by corresponding upper surfaces on the sole plate in a vertically adjusted upper position and sole depressors on the sole plate for releasably retaining a ski boot on the sole plate, the improvement which comprises at least one recess in the sole plate, a slide member having a lower end and an upper end disposed in said recess for limited vertical movement relative to the sole plate, said slide member upper end engageable by the sole of a ski boot accommodated within the sole depressors, the sole depressors acting downwardly on

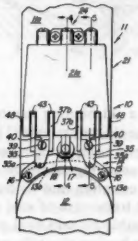
the sole of the ski boot, to move the sole plate vertically upward relative to said slide member with said slide member lower end in engagement with the ski for abutting engagement of the corresponding upper surfaces on the sole plate with the fittings in said vertically adjusted upper position of the sole plate.

3,992,032

ADJUSTABLE RELEASE SKI BINDING

Glen R. Swenson, 3152 Valley, Salt Lake City, Utah 84109

Filed Apr. 25, 1975, Ser. No. 571,513
Int. Cl.² A63C *9/08*
U.S. Cl. 280—632 **10 Claims**



1. An adjustable release ski binding comprising a housing arranged for attachment to a conventional snow ski;
means for attaching said housing to said ski;
roller means arranged to extend outwardly from said housing to engage the forward end of the sole of a conventional ski boot when in position on a ski;
biasing means arranged within said housing for urging said roller means outwardly from said housing;
means for adjusting the amount of biasing force said biasing means exerts against said roller means;
clamp means extending outwardly from said housing disposed alongside said roller means, and arranged to pivot vertically from an attitude above and parallel to said conventional snow ski to an upright attitude with respect to said conventional snow ski and having a clamp member to engage the top surface of the boot sole at the forward end thereof;
means for biasing said clamp means to the attitude above and parallel to said conventional snow ski; and
means for adjusting the biasing force exerted by said biasing means tending to maintain said clamp means in said attitude above, and parallel to said conventional snow ski.

3,992,033

COLLAPSIBLE LUGGAGE CARRIER

Phyllis D. Zawislak, Huntington, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 506,823, Sept. 17, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,705
Int. Cl.² B62B *3/04*
U.S. Cl. 280—651 **3 Claims**

1. A foldable wheeled luggage carrier that in the erected state is formed of
a horizontally inclined luggage platform extending forward of the lower section of the carrier,
a first back upright member pivotably mounted to the rear of the said luggage platform,
a horizontal shelf, the front of which is detachably mounted to the rear of the mid-section of the said first back upright member and pivotably mounted at its rear to
a second back upright member extending upwards from the rear of the horizontal shelf, with the top of the second back upright member serving as a handle for moving the carrier on
a pair of front wheels mounted to an axle joined to the rear of the underside of the luggage platform and
a third wheel rotatably mounted to the lower ends of
a support frame that is pivotably joined at its upper end in a detachable manner to a clip on the rear of the mid-section of the first back upright member, with the mid-sections of the said support frame pivotably joined to the mid-sections of

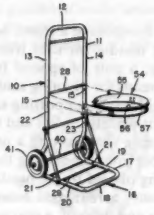
a pair of rods, one mounted on each side of the unit, with the lower end of each said rod arm pivotably joined to the axle of the front wheels and the upper end of each rod rotatably joined to a side of the lower section of second back upright member, such that
detaching of the upper end of the support frame from the clip on the rear of first back upright member and detaching of the front of the shelf from its mounting to the back of said first back upright member enables the members of the carrier to fold to form a compact package, when not in use.

3,992,034

MULTIPURPOSE KNOCKDOWN HANDCART

Harvey J. Smith, Sr., 1211 Buckingham Road, and John T. Lipford, 303 Sunset Drive, both of Greensboro, N.C. 27408

Filed Aug. 22, 1975, Ser. No. 606,759
Int. Cl.² B62B *1/00*
U.S. Cl. 280—654 **4 Claims**

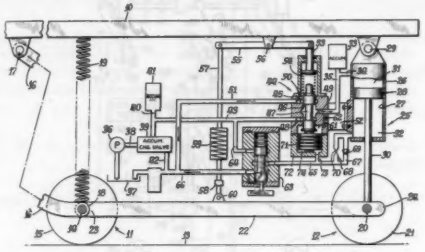


1. A multipurpose knockdown handcart comprising: A first inverted U-shaped top rail, a second U-shaped platform rail, means connecting said U-shaped top rail and said U-shaped platform rail, spaced-apart wheels mounted to said connecting means for supporting said hand cart for movement, a bag supporting means, said bag supporting means having a circular hoop, a pair of laterally-spaced arms secured to said hoop, each of said arms having a barengaging hook thereon and a stabilizing flange for engaging said U-shaped top rail, said hoop having a flexible member for releasably retaining a bag on said hoop in open condition, and said hoop having a plurality of openings therein, said flexible member having terminal ends laced in said openings for tightening and locking said flexible member therein while retaining a bag on said hoop.

3,992,035
COMBINATION HYDRAULIC AND MECHANICAL SUSPENSION SYSTEM

Joseph E. Dezelan, Indian Head Park, and David S. Vinton, Morton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 20, 1975, Ser. No. 588,939
Int. Cl.² B60P 1/60
U.S. Cl. 280—683 **11 Claims**



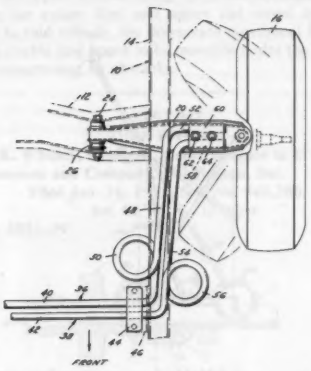
1. A tandem axle suspension system for a vehicle, comprising in combination:
a vehicle frame;
a first axle;
first mounting means for mounting said first axle beneath said frame and including a first beam for connecting said first axle to said frame and first spring means for resiliently supporting said frame on said first axle;
a second axle;
second mounting means for mounting said second axle beneath said frame in tandem with said first axle and including a second beam for connecting said second axle to said frame adjustable fluid spring means including a piston and cylinder assembly connected between said frame and said second axle for adjustably supporting said frame on said first and second axles; and
leveling control means including a source of pressurized fluid including first accumulator means for supplying fluid for said fluid spring, second accumulator means in open communication with the head end of said piston and cylinder assembly, and leveling valve means for controlling communication of fluid from said source to said second accumulator and said piston and cylinder assembly for controlling the fluid spring means for maintaining said frame at a predetermined height above said axles, wherein said first beam is pivotally connected at one end to said frame and connected at the other end to the first axle; and, said second beam is pivotally connected at one end to said first axle and connected at the other end to said second axle.

3,992,036
INDEPENDENT FRONT SUSPENSION SYSTEM FOR A MOTOR VEHICLE

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,805
Int. Cl.² B60G 3/18, 11/18
U.S. Cl. 280—695 **12 Claims**

1. An independent suspension system for a motor vehicle comprising a vehicle frame, a road wheel, and suspension means connecting said wheel to said frame;
said suspension means comprising a wheel support member rotatably supporting said road wheel;
a suspension arm interconnecting said wheel support member and said frame;
a spring bar having a first portion mounted on said vehicle frame at a location longitudinally spaced apart from the axis of rotation of said wheel;
said bar having a second end portion connected to said suspension arm;

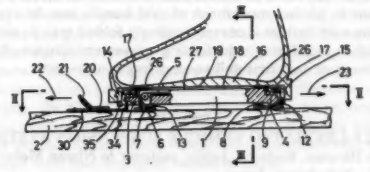


said bar having at least one integral loop situated intermediate said first and second portions;
said loop being arranged in a generally horizontal plane.

3,992,037
SKI BINDING

Jean-Paul Fréchin, Chamonix, France, assignor to Garcia Corporation, Teaneck, N.J.

Filed Dec. 15, 1975, Ser. No. 640,844
Claims priority, application France, Dec. 23, 1974, 74.42494
Int. Cl.² A63C 9/08
U.S. Cl. 280—613 **23 Claims**



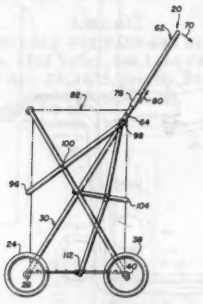
1. In combination, a ski boot having a rigid sole, a sole-plate, means for firmly locking the boot sole and sole-plate together to form a sole-plate and boot unit, means for voluntarily unlocking the boot sole from the sole-plate, and a safety binding mechanism including safety release means for releasably holding the sole-plate on a ski while allowing release of the sole-plate and boot unit from the ski in the event of a force exceeding a given value acting on the sole-plate and boot unit, said safety release means being independent of said voluntary unlocking means, wherein the boot sole has a peripheral wall defining a recessed housing in the boot sole of shape and dimensions to receive the sole-plate therein, and said means for firmly locking together the boot sole and the sole plate comprises complementary locking means disposed at at least two substantially opposite locations of the periphery of the sole-plate and said wall of the boot sole on facing parts of the periphery of the sole-plate and of said wall.

3,992,038

SHOPPING CART

Bernard Guadano, Sr., P.O. Box 112, Seaford, N.Y. 11783

Filed July 10, 1975, Ser. No. 594,665
Int. Cl.² B62B 3/02
U.S. Cl. 280—659 6 Claims



1. A shopping cart foldable from an open bag-supporting condition into a closed compact storage condition comprising a pair of front wheels, a front axle connected in spanning relation between said front wheels, a first rearwardly angled frame member supported on said front axle, a pair of rear wheels, a rear axle connected in spanning relation between said rear wheels, a second cooperating forwardly angled frame member supported on said rear axle, a pivotal connection of said front and second frame members to each other to provide scissors-type opening and closing movements therebetween so as to enable said shopping cart to fold from said open condition into said closed condition, a pair of members each respectively connected along one edge to said front and rear axles and at an opposite edge hinged to each other to form a bottom for said cart supported in spanning relation between said front and rear axles, a handle for said cart pivotally connected adjacent the top of said rearwardly angled first frame member, and a bottom-folding member pivotally connected at one end to said bottom pair of members adjacent said hinge thereof and at its other end to an extension of said handle, whereby incident to pivotal movement of said handle into its storage position said bottom is correspondingly folded into its storage condition and during said folding movement causes closing movement of said first and second frame members.

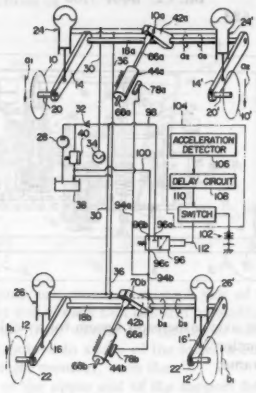
3,992,039

SELF-LEVELLING VEHICLE SUSPENSION SYSTEM

Mitue Hiruma, Kodaira, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 8, 1975, Ser. No. 620,841
Claims priority, application Japan, Oct. 14, 1974, 49-118436
Int. Cl.² B60G 21/06
U.S. Cl. 280—703 17 Claims

1. In a self-levelling suspension system of an automotive vehicle with at least one set of cooperative road wheels and including suspension members respectively connected to said road wheels, a lateral stabilizer bar connected between said suspension members and rotatable about its axis as the road wheels are caused to vertically move relative to the body structure of the vehicle and a hydropneumatically-operated self-levelling strut connected between the vehicle body structure and each of said suspension members, a vehicle body position control device for locking said stabilizer bar relative to the vehicle body structure during acceleration or deceleration of the vehicle, said device comprising a suspension control unit comprising a cylinder axially movable relative to the vehicle body structure, a piston axially movable in said cylinder, an elongated connecting member fixedly connected at one end to said piston and pivotally connected at the other end to said stabilizer bar, biasing means urging said piston into a predetermined equilibrium position in said cylinder and locking means having a first condition allowing said cylinder to axially move relative to the vehicle body structure and a second condition holding the cylinder locked relative to the



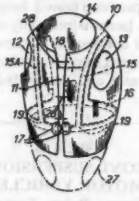
vehicle body structure, and control means responsive to the rate of change of the cruising velocity of the vehicle and operative to hold said locking means in said first condition thereof when the rate of change of the vehicle velocity is within a predetermined range and to actuate said locking means into said second condition thereof when the rate of change of the vehicle velocity is outside said predetermined range.

3,992,040

SAFETY HARNESS FOR USE BY A CHILD IN A VEHICLE

Jean-Philippe Gannac, 32 Avenue Thierry, Ville d'Avray (Hauts-de-Seine), France

Filed June 30, 1975, Ser. No. 591,761
Claims priority, application France, July 9, 1974, 74.23758
Int. Cl.² B60R 21/10
U.S. Cl. 280—744 10 Claims



1. A safety harness for use by a child in a vehicle, comprising:

a waistcoat having a front opening;

an abdominal belt carried by the waistcoat, said belt having a front region with front buckle means and a rear region;

a pair of shoulder straps carried by the waistcoat, said shoulder straps being connected to the belt front region at both sides of the front buckle means and extending from said belt front region and connected to the belt rear region;

said waistcoat having a rear attachment region defined between said shoulder straps above said belt rear region;

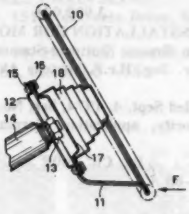
and connecting means secured to said waistcoat rear attachment region and having means for securement to a fixed structure of a vehicle.

3,992,041

SAFETY STEERING WHEEL FOR MOTOR VEHICLES

Sergio Vernocchi, Arese (Milan), Italy, assignor to Industria Napoletana Costruzione Autoveicoli Alfa Romeo Alfasud S.p.A., Naples, Italy

Filed Aug. 27, 1975, Ser. No. 608,252
Claims priority, application Italy, Sept. 4, 1974, 26929/74
Int. Cl.² B60R 21/02
U.S. Cl. 280—750 9 Claims



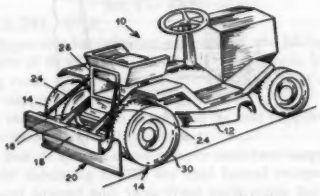
1. A safety steering wheel for motor vehicles, comprising a rigid steering wheel rim, a flexure-yieldable structure attached to said steering wheel rim and including means for fixing the rim to an inclined steering column of a vehicle so that the steering wheel rim will rotate with respect to the steering column axis of rotation, from an inclined plane to a plane lying substantially perpendicular to an impact direction due to impact of a driver's body with the steering wheel rim, said flexure-yieldable structure having a substantially flat form and comprising a rigid perimeter flange attached to the steering wheel rim for rotating therewith in case of impact, a rigid central hub including means to be fixed to the steering column, and flexure-yieldable connecting rods attached to said perimeter flange and said central hub for allowing the former to rotate with respect to the latter in case of impact, a rigid cover fixed onto said perimeter flange of the flexure-yieldable structure to rotate therewith for substantially avoiding any axial movement thereof toward the steering column in case of impact, and a compression-yieldable structure fixed on said rigid cover to rotate therewith in case of impact and substantially disposed between the rigid cover and the plane of the steering wheel rim to act, after rotation of the steering wheel rim and the rigid cover, as a compression-yieldable resistant element disposed forwardly of the steering column in the impact direction to yieldably resist the movement of a driver's body towards the steering column.

3,992,042

RIDING VEHICLE WITH SAFETY APRON

Michael H. Helmick, and Hans Hauser, both of Fredericktown, Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio

Filed June 30, 1975, Ser. No. 591,754
Int. Cl.² B60R 27/00
U.S. Cl. 280—762 15 Claims



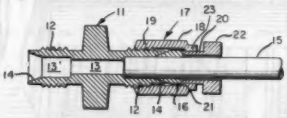
1. In combination, a vehicle having a frame and a rear wheel rotatably carried under said frame, a flexible apron extending at least a substantial portion of the width of the vehicle, means carried by said vehicle for supporting said apron behind the vehicle and behind said rear wheel, with the lower edge of said apron located above the ground, the heighth of said apron being sufficient to enable said apron to be movable under the rear wheel upon encountering an obstacle, and means for limiting the extent that said apron can move downwardly relative to said vehicle, the downward movement being sufficient to enable said apron to be movable under the rear wheel upon encountering an obstacle.

3,992,043

TUBE FITTING

Robert K. Whitley, Pasadena, Calif., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 16, 1975, Ser. No. 541,380
Int. Cl.² F16L 35/00
U.S. Cl. 285—39 6 Claims



1. In a tube fitting comprising: at least one cylindrically-shaped ferrule with a tapered end and an abutment end; a body part having an externally threaded cylindrical extension and an internal channel terminating at the end of the extension in a frustroconically-shaped mouth which engages the tapered end of said ferrule; and a nut having a wall with an internally threaded portion for engaging the threaded extension of said body part and an abutment means, said wall defining a cavity containing said ferrule and, said ferrule and said nut having channels running through them with axes concentric with the axis of the channel in the extension of said body; the improvement wherein said nut comprises two movably interconnected parts, a first nut part, as described above, and a second nut part comprising a thin tubular portion passing through the channel in said first nut part into the cavity, the end of said thin tubular portion which extends into the cavity being radially flared and being disposed in abutting engagement with the abutment means of said first nut part, the flare having a diameter greater than the diameter of the channel in said first nut part but less than the diameter of the cavity in said first nut part, thereby preventing dissociation of the two nut parts while allowing rotation of the first nut part relative to the second nut part around the axis of the channels in said nut parts, the flared end of the thin tubular portion being in locking contact with the abutment end of said ferrule and the end of the thin tubular portion, opposite said flared end, being provided with tool engaging means thereon.

3,992,044

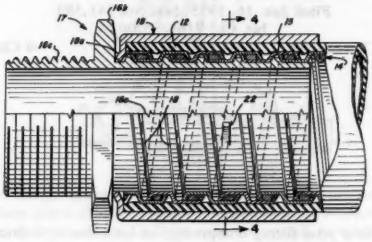
FLEXIBLE METAL CONDUIT WITH SEALED END CONNECTORS

Bernard J. Muslin, Chicago, Ill., assignor to Specialty Connector Corporation, Chicago, Ill.

Filed Nov. 29, 1974, Ser. No. 528,085
Int. Cl.² F16L 33/22, 33/26
U.S. Cl. 285—92 8 Claims

1. An electrical conduit and connector assemblage comprising a spirally wound continuous metal conduit defining on the inside thereof a longitudinally spiralling groove, said conduit having at least at the ends thereof a thin covering of an air-impervious resilient material, an air and liquid tight two piece connector assembly secured to each end of said conduit, each of said connector assemblies comprising: a first air-impervious, generally cylindrical sleeve member enveloping the covering material at the associated end of the conduit, said sleeve member terminating at the outer end of the conduit in a con-

tinuous annular inwardly extending resilient lip confronting and engaging an end portion of said conduit, and a second coupling member including a generally cylindrical sleeve portion having integral external threading which projects outwardly from the said sleeve portion and which snugly interfits within the spiralling groove on the inside of said conduit, said coupling member including a flange integral with said sleeve portion and extending radially outwardly therefrom, said flange confronting said lip, said sleeve member and said sleeve portion coacting to compress said covering material therebetween to define at least an annular zone which forms a liquid and airtight seal thereby to prevent the passage of air and liquid between said sleeve member and said covering material into the region between said sleeve portion and



the inside of said conduit, said lip and said flange providing a seal between them to prevent the passage of air and liquid from outwardly of said connector assembly into the region between said sleeve portion and said conduit, said coupling member being locked in place within the adjacent end of said conduit and against ready removal therefrom by a projection in addition to said threading extending outwardly from the sleeve portion and projecting into engagement with said conduit at a location axially spaced from the terminal end of said conduit, and said coupling member having on the side of such flange opposite the side facing said sleeve member an axially extending open ended anchoring member-receiving portion of smaller extent than said flange for engaging with an anchoring member which holds the coupling member in place within an opening in a wall or the like.

3,992,045

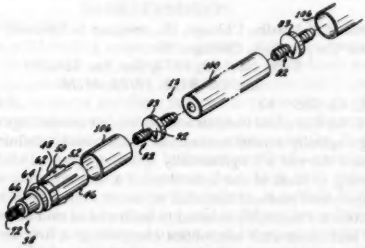
MEANS FOR COUPLING AND SEALING MEMBRANE CARRYING TUBE SECTIONS

Alfred Whittell, Jr., Los Angeles, and Leo Block, Westlake Village, both of Calif., assignors to Rev-O-Pak, Inc., Newbury Park, Calif.

Filed Feb. 3, 1975, Ser. No. 546,449

Int. Cl.² B01D *29/10*

U.S. Cl. 285—371 **9 Claims**



9. Coupling means for making a coupling, the coupling being adapted for coupling tubular porous core sections each having an axial bore and each having a separating membrane coating the surface thereof, the coupling means comprising a connecter member having a nipple part adapted for securement in the end of the bore of a core section, the connector having an axial bore therethrough, the nipple having an helical rib configurated to provide securement in the bore of the core section and there being an helical groove between rib convolutions inside the bore, whereby cleaning fluid can permeate through a core into the helical groove and can then travel axially to the end of the nipple.

3,992,046

SAFETY INSTALLATION FOR MOTOR VEHICLES

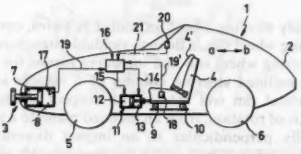
Hans-Hermann Braess, Stuttgart-Stammheim, Germany, assignor to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft, Germany

Filed Sept. 4, 1974, Ser. No. 502,943

Claims priority, application Germany, Sept. 5, 1973, 2344689

Int. Cl.² B60R *21/08*

U.S. Cl. 296—65 A **13 Claims**



12. A safety installation for motor vehicles in operative association with seat means rectilinearly movable along the longitudinal axis direction of the vehicle body and having a retention means for retaining a passenger, characterized in that the safety installation includes means operatively connected with the seat means and vehicle body for initially displacing the seat means opposite the driving direction at the beginning of an impact accident and then positively displacing the seat means along said longitudinal axis in the driving direction to maintain a substantially constant but tolerable human deceleration level during the remainder of the impact accident.

3,992,047

MOTOR ACTUATED SHIFTABLE SUPPLEMENTAL BUMPER

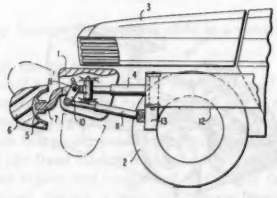
Béla Barényi, Sindelfingen, and Hermann Renner, Magstadt, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Oct. 16, 1974, Ser. No. 515,259

Claims priority, application Germany, Oct. 17, 1973, 2352179

Int. Cl.² B60R *19/06, 19/08, 21/14*; B61F *19/04*

U.S. Cl. 293—9 **13 Claims**



1. A protective installation for vehicles comprising a bumper member mounted at a relatively fixed part of a vehicle to extend outwardly from the vehicle end; cross-beam means mounted to extend outwardly of said bumper member; pivot

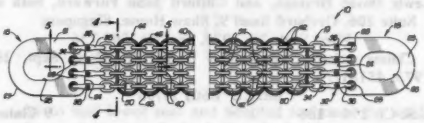
means for pivoting said cross-beam means at said bumper member, said pivot means including torsion spring means and first lever means connected to said cross-beam means and said torsion spring means for pivotally positioning said cross-beam means; and adjusting means connected to said torsion spring means for rotating said torsion spring means such that said cross-beam means is adjustable in position.

3,992,048

BELT CHAIN SLING

Michael L. Berzenye, 15147 Rayneta Drive, Sherman Oaks, Calif. 91403

Filed Mar. 19, 1975, Ser. No. 559,747
Int. Cl.² B66C *1/18*
U.S. Cl. 294—74 **7 Claims**



1. A belt chain sling for material handling comprising:

a pair of handles, a belt portion of predetermined length and width extending between said handles and having ends each of which is respectively connected to one of said handles, said belt portion including a plurality of sections of chain and interlacing means associated with said sections of chains to stabilize said sections of chain and create a coaction between the same;

said sections of chain are composed of interconnection links and all of the sections are of equal length and are arranged in general parallel elongated relationship one with the other, and there are two outer sections of chains;

each link of each section of chain across the width of said belt portion is aligned forming rows, and each row of links commencing from the row attached to the handles is alternately arranged on a horizontal plane and a vertical plane, and said interlacing means pass through said vertically arranged rows of links whereby said rows of said links will be maintained in said alternate planar arrangement; and

spacer means are associated with said interlacing means and are interposed between said links of each of said vertically arranged rows whereby said sections of chain are maintained in parallel relationship.

3,992,049

APPARATUS FOR STACKING BRICKS IN PREPARATION FOR STRAPPING

William F. Milholen, Siler City, and Cletus E. Lineberry, Staley, both of N.C., assignors to Forrest Paschal Machinery Co., Siler City, N.C.

Division of Ser. No. 469,649, May 14, 1974, Pat. No. 3,924,756. This application June 25, 1975, Ser. No. 590,261
Int. Cl.² B65G *57/02*
U.S. Cl. 294—87 R **3 Claims**

1. Apparatus for gripping, supporting, and lifting a plurality of layers of fired bricks, at least the uppermost layer thereof having voids or openings therein, said apparatus comprising:

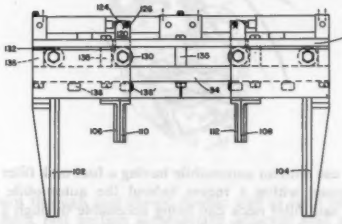
a. a support means;

b. a mounting means supported by said support means for reciprocal vertical movement;

c. a pair of spaced outer gripper members suspended from said mounting means for said lateral reciprocal movement toward and away from each other for holding an entire layer of bricks between corresponding lower portions thereof when moved toward each other;

d. a plurality of at least four inner gripper members depending from said mounting means in spaced, parallel relationship between said outer gripper members, said inner gripper members being laterally reciprocally movable between a first normal position and a second gripping position, the length of said outer gripper members exceeding the length of said inner gripper members by at least the height of a brick layer;

e. first and second ones of said inner gripper members being the outermost of said inner grippers and moved in a direction toward the outer gripper members when moved from said first to said second position to hold some selected bricks of the uppermost layer therebetween;



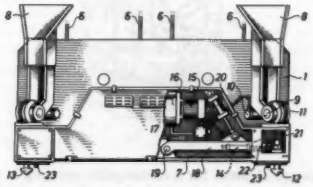
f. third and fourth ones of said inner gripper members being the innermost of said inner grippers and moved in a direction toward each other when moved to said second position to hold other selected bricks of the uppermost layer therebetween.

3,992,050

SPREADER FRAME

Hans Ulrick Backteman, Lusthusbacken 14, Bromma, Sweden

Filed June 3, 1975, Ser. No. 583,253
Claims priority, application Sweden, June 5, 1974, 74074253
Int. Cl.² B66C *1/00*
U.S. Cl. 294—81 SF **4 Claims**



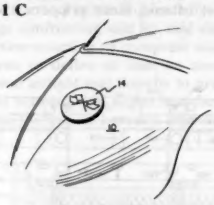
1. A spreader device for handling containers and comprising a central frame and side beams extending therefrom, said side beams at their outer portions being connected in pairs to each other by transverse or cross beams, said spreader also comprising twistlocks being movable into and out of said transverse or cross beams, wherein said twistlocks are movable between a protected positon within the transverse or cross beams and a container coupling position wherein the twistlocks protruded from the transverse or cross beams, the improvement wherein said movement is performed along arcs by a swingable arm mechanism comprising a swingable arm pivotably journalled at one end thereof and at its other end connected to said twistlock, and a pivotably mounted driving device located along the swingable arm between the ends thereof for moving said swingable arm and hence said twistlock.

3,992,051

PROTECTOR FOR AUTOMOBILE FUEL TANK FILLER NECK

Ronald James Hitch, 1616 Harrington Drive, Champaign, Ill. 61820

Filed Nov. 19, 1975, Ser. No. 633,463
Int. Cl.² B60R 27/00
U.S. Cl. 296—1 C 6 Claims



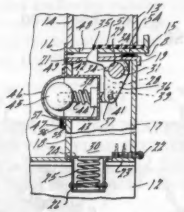
1. For use with an automobile having a fuel tank filler neck cap disposed within a recess behind the automobile body exterior, said filler neck cap being accessible through a door in the automobile exterior body surface, and said recess and said door defining an enclosure therebetween, a flexible flap for protecting the exterior surface finish during fuel filling operations, said flap being permanently attached interiorly of said enclosure and having a first storage position in which said flap is stored within said enclosure when said door is closed, and, when said door is open, a second use position covering the exterior surface adjacent said recess to prevent marring of the surface finish during fuel tank filling.

3,992,052

ESCAPE DOOR FOR TRAILER

William M. Green, 11278 Ford Road, Brighton, Mich. 48116

Filed Mar. 11, 1974, Ser. No. 450,003
Int. Cl.² B60J 9/02
U.S. Cl. 296—28 M 1 Claim



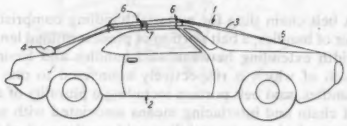
1. A closure element for a rectangular opening in the outer wall of a trailer body and located remote from the trailer door,
plate means provided at the top and sides of the opening,
hinge means along the longer horizontal bottom edge of the opening,
a door member having plate means along the top and bottom with the bottom supported on the hinge means for movement between closed and open positions,
said plate means at the top of said door having aligned openings,
spaced inwardly extending apertured bracket means supported on said plate means at the top of the door member and extending toward said hinge means,
a shaft rotatably supported in the apertures of the bracket means,
a pair of latch means secured in fixed relation one at each end of said shaft for rotation therewith,
latch means extending from the opening in the plate means on said door member into latching engagement with the plate means at the top of the opening,
said shaft having a downwardly extending arm fixed thereto,
an operating rod, and a pivot connecting said arm and rod for producing movement of said arm and rotation of said shaft in response to movement of said rod,
a ball provided on the end of said rod, a cup having an open end surrounding said ball and rod, and a spring pressed cap for enclosing said cup end,
spring means engaging said door member for resiliently biasing said door toward said open position when said latch means is released, and said plate at the top of said opening having a vertically extended flange spaced outwardly from the exterior surface of the outer wall to form a trough.

3,992,053

SUN SHIELD FOR AUTOMOBILES

Lewis David Hrytzak, and Clifford John Forward, both of Suite 206, Orchard Road 9, Shaw House, Singapore

Filed Sept. 26, 1974, Ser. No. 509,736
Claims priority, application United Kingdom, Sept. 26, 1973, 45181/73
Int. Cl.² B60J 11/00
U.S. Cl. 296—136 9 Claims



1. A sun shielding apparatus for use on an automobile and the like, comprising:
screening material means for extending over and forming a canopy above said automobile;
roller means mounted on said automobile and attached to one end of said screening material means for winding said screening material means thereon; and
collapsible spacing means attached to said screening means and windable with said screening means about said roller means for spacing said screening material means above said automobile when unwound from said roller means, said spacing means being comprised of:
a plurality of stiffening braces attached to and extending laterally across said screen material means on the side thereof adjacent said automobile, and
a plurality of support legs hingedly fixed to each stiffening brace and hingeable downward against said automobile for spacing said stiffening braces and said screening material means attached thereto above the automobile and hingeable upward against said stiffening braces for being rolled up with said screening material means when said screening material means is rolled about said roller means.

3,992,054

BICYCLE SADDLE SUPPORT

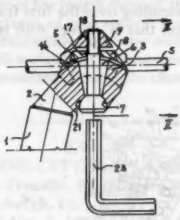
Tullio Campagnolo, Corso Padova, 168, 36100 Vicenza, Italy

Filed Apr. 8, 1975, Ser. No. 566,628
Claims priority, application Italy, Apr. 11, 1974, 21260/74
Int. Cl.² B62J 1/00; F16C 1/00
U.S. Cl. 297—195 10 Claims

1. Adjustable saddle support for supporting bicycle saddles and the like, of the type in which means for supporting a saddle in an adjustable position and removably locking its frame, are associated with a head formed in one piece with, and at the top of a pillar for insertion into the saddle tube of a bicycle frame, in which said means are engaged with said head by way of two pairs of complementary conical surfaces,
said head comprises at its top two lateral tracks, formed from spaced-apart opposing portions of conical surfaces

having a common axis, which surfaces bestow on it a wedge-like configuration,

said saddle support means comprise: a cross support, with a lower central seat adapted to mate with the upper wedge part of said head and to slide, with two conical surfaces which bound it laterally, on conical surface tracks of the head, so as to oscillate about the common axis of said tracks, and a pair of upper lateral seats, paral-



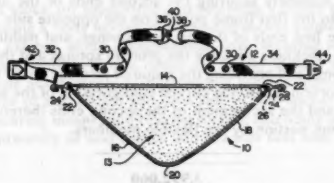
lel to said lower seat and adapted to house the saddle frame elements to be locked; and a locking stirrup, comprising two lower lateral parallel seats adapted to cooperate with the upper lateral seats of the cross support, for housing said saddle frame elements, the stirrup being pressed on to the support, and the stirrup-and-support unit being in turn pressed on to the head by a single coupling member.

3,992,055

SPORTSMAN SLING SEAT

Jack B. Shaw, 2710 Bedford St., and Donald E. Shaw, 325 Suie St., both of Johnstown, Pa. 15904

Filed Jan. 29, 1975, Ser. No. 545,141
Int. Cl.² A47C 7/62
U.S. Cl. 297—217 **9 Claims**



1. A collapsible seat for attachment to a vertical column comprising:

a strap for encompassing said column having a pair of hinge elements pinned together for relieving stress by allowing pivotal motion;

a sling consisting of a single piece of flexible planar material having a front, back and two side edges, said back edge being longer then said front edges, and said side edges being oblique to said back edges; and

means for detachably mounting said sling directly to said strap at the ends of said back edge.

3,992,056

CAR SEAT

Jerome P. Koziatek, Hinckley, Ohio, and Leo F. Wildgen, Minneapolis, Minn., assignors to Questor Corporation, Toledo, Ohio

Filed July 14, 1975, Ser. No. 595,700
Int. Cl.² A47C 1/08
U.S. Cl. 297—250 **9 Claims**

1. A car seat for use in an automobile having an adult restraining system, said seat comprising

an integral substantially closed double-walled molded shell, said shell comprising

a seat section,

a back seat section; and

side panel sections extending substantially the length of said seat section and said back section;

a slot through said closed double wall in each side of said back rest section substantially adjacent said associated side panel section, and above said seat section, said slots being of a dimension to accept said adult restraining system; and

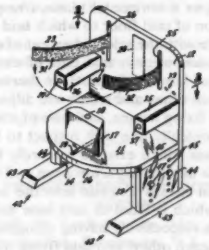
restraint harness means secured to said shell for retaining the occupant within said shell.

3,992,057

SIMPLIFIED ADJUSTABLE CHAIR FOR CHILDREN WITH CEREBRAL PALSY

Gary Weldon Studebaker, 9340 Buell St., Downey, Calif. 90241

Filed Feb. 3, 1975, Ser. No. 546,305
Int. Cl.² A47C 3/00
U.S. Cl. 297—384 **2 Claims**



1. An adjustable chair for children with cerebral palsy, the chair comprising:

a board-type back;

a board-type seat, fixed to said back at substantially right angles;

a pair of parallel disposed board-type brackets fixed to the underside of said seat, so that said brackets support said seat;

said back having a pair of parallel vertically disposed slots formed therein;

a strap disposed within said slots so that it is movable in a vertical direction;

means on the strap to fasten the ends thereof;

a pair of adjustable, removable arm rests disposed to be fastened to said back;

said arm rests being elongated and each arm rest having a bolt passing through its length and beyond one end; said back having a plurality of holes adjacent each said vertical slot; said arm rests being adjustably attached to said

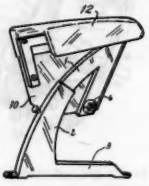
back by inserting the extended portion of each bolt into one of said holes and securing it therein with a nut.

3,992,058

ADJUSTABLE ARMCHAIRS FOR THEATRES OR THE LIKE

Jose Figueras Mitjans, Calle Muntaner, 515, Barcelona, Spain

Filed Apr. 9, 1975, Ser. No. 566,330
Int. Cl.² A47C 1/12
U.S. Cl. 297—422 **6 Claims**



1. In a chair for a theatre or the like having a floor a portion of which extends at a given angle with respect to a horizontal plane, a side unit having an upper edge region forming an arm for the chair and having an inner surface, elongated extension means fixed to said side unit at said inner surface thereof and extending downwardly from a portion of said unit, base means adapted to be fixed with said portion of said floor and fixedly carrying an extension means which extends upwardly from said base means, and fixing means operatively connected with both of said extension means for adjustably fixing said extension means which is fixed to said portion of said side unit to said extension means which extends upwardly from said base means in a position overlapping the latter extension means to a selected extent, said pair of extension means cooperating with each other for providing for said upper edge region of said side unit, and thus for said arm of said chair, a selected angle with respect to a horizontal plane, irrespective of the angle of said portion of said floor to which said base means is fixed, in accordance with the selected extent of overlap of said pair of said extension means, said pair of extension means both being curved at least at the portions thereof which overlap and engage each other and which are adjustably fixed to each other by said fixing means, said pair of extension means cooperating telescopically one with respect to the other, and said extension means which extends upwardly from said base means being hollow and having a top open end through which the other extension means extends into the interior of said extension means which is fixed to said base means, said pair of extension means respectively having elongated curved wall portions engaging each other, and said fixing means including a region of one of said wall portions formed with a series of openings distributed longitudinally along said region and a region of the other of said wall portions formed with an opening to be aligned with an opening of said region of said one wall portion, and a fastener situated in said opening of said other wall portion and in a selected one of said openings at said region of said one wall portion for releasably fixing the pair of extension means to each other with a selected extent of overlap.

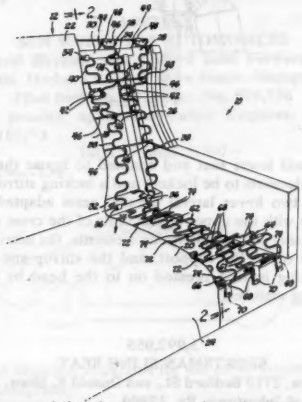
3,992,059

SEAT EDGE CONSTRUCTION

Henry L. Kloepfer, Thornhill, Canada, assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Oct. 6, 1975, Ser. No. 619,730
Int. Cl.² A47C 7/02
U.S. Cl. 297—452 **7 Claims**

1. A seat construction comprising: a frame including a first portion extending alongside an exposed edge of the seat and a second portion spaced from the first portion; a plurality of primary sinuous springs extending between the first and second frame portions with sinuous configurations so as to provide support for padding of the seat; a plurality of auxiliary sinuous springs respectively associated with the primary springs adjacent said exposed edge of the seat; the auxiliary springs having first ends secured to intermediate portions of the primary springs and extending toward the exposed edge of the seat with sinuous configurations that provide support for the padding of the seat adjacent the exposed edge thereof; the auxiliary springs extending over the first frame portion with a curved configuration that is convex with respect to the padding supported thereby so as to reduce the thickness of padding necessary to cushion said exposed edge of the seat; the auxiliary springs having second ends located adjacent the first frame portion on an opposite side thereof from their first ends; flexible members securing the second ends of the auxiliary springs to the first frame portion on the opposite side thereof from the first ends of the auxiliary springs; and padding of a uniform thickness covering the primary springs and the auxiliary springs and providing the required resiliency over the first frame portion due to the curved configuration of the auxiliary springs and the securement of the second ends thereof to the first frame portion by the flexible members.

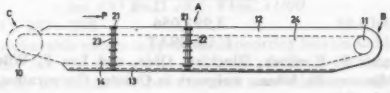


3,992,060

CONVEYING APPARATUS

Gunther Bargel, Werne; Willy Tyslauk, Altlunen; Eberhard Unger, Altlunen, and Wolfgang Müller, Altlunen, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Westfalia, Germany

Continuation of Ser. No. 413,999, Nov. 8, 1973, abandoned.
This application May 2, 1975, Ser. No. 574,200
Claims priority, application Germany, Nov. 20, 1972, 2256917
Int. Cl.² E21C 35/02; B65G 23/00, 15/60
U.S. Cl. 299—67 **15 Claims**



1. In conveying apparatus which comprises a scraper-chain assembly, support means which generally defines a longitudinal path along which the assembly can be moved at least part of said path being in the form of a generally U-shaped guide

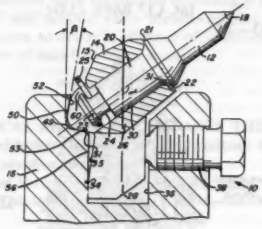
channel with a conveying surface located between side wall surfaces and drive means for moving the assembly along said path to effect transference of material; the improvement comprising providing an electric motor which constitutes at least part of said drive means and which has a stator housing, said stator housing of the motor forming a complete section of the support means, which section constitutes part of said path and guide channel and has a conveying surface between side wall surfaces extending across the full width of the guide channel and over a portion of the length thereof, the conveying surface and side wall surfaces of said section provided by the stator housing being substantially co-planar with the conveying surface and side wall surfaces of at least one adjacent adjoining portion of the remainder of the guide channel provided by the support means.

3,992,061

MINING CUTTER BIT ASSEMBLY

Lester G. Rollins, Franklin, Pa., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Apr. 7, 1975, Ser. No. 565,412
Int. Cl.² E21C *13/00*
U.S. Cl. 299—86 **15 Claims**



1. A block for supporting and retaining a cutter bit holder comprising a body having an elongated socket formed therein which extends along a longitudinal axis; securing means for tightening and holding a cutter bit holder in said socket; at least one substantially planar bearing surface formed at the entrance of said socket and on a side of said socket opposite said securing means; said bearing surface extending in a direction outwardly of said socket and towards said axis.

3,992,062

COMBINATION FLUID PRESSURE AND ELECTRIC TRIP COCK EMERGENCY BRAKE APPARATUS FOR RAILWAY VEHICLES

William B. Jeffrey, North Huntingdon Township, Westmoreland County, Pa., and Richard K. Frill, deceased, late of Borough of Baldwin, Allegheny County, Pa. (Patricia R. Frill, executrix), Whitehall, Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed July 10, 1975, Ser. No. 594,722
Int. Cl.² B60T *13/66*
U.S. Cl. 303—3 **6 Claims**

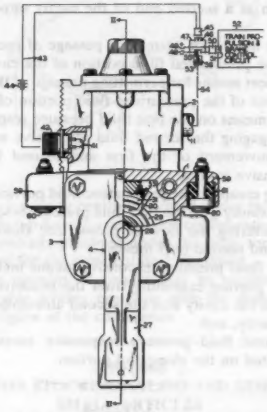
1. In railway vehicle brake apparatus including a brake pipe extending the length of a train operable on a railroad right-of-way and in which the brake pipe is normally charged with fluid at a predetermined pressure and is effective, upon a reduction of pressure therein, for causing a brake application on the train according to the degree of such brake pipe pressure reduction, the combination of:

a. actuating means effective when energized for concurrently cutting off vehicle propulsion power and causing a reduction of brake pipe pressure;

b. first energizing means connected to said actuating means and operable from a normally open position, in which said actuating means is deenergized, to a closed position for effecting energization of said actuating means;

c. second energizing means connected to said actuating means in parallel relation with and operable independently of said first energizing means from a normally open position, in which said actuating means is deenergized, to a closed position for effecting energization of said actuating means; and

wherein the improvement comprises:



d. a trip cock device mounted on the vehicle and including:

i. dual operating means comprising two operating portions each operable from a neutral position to an operating position for effecting operation of said first and second energizing means, respectively and independently of each other, to their respective closed positions; and

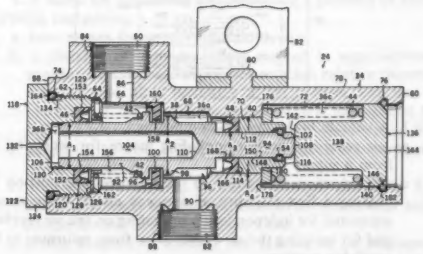
ii. trip means operably engaging said two operating portions of the dual operating means and effective, when tripped out of a neutral position, for concurrently operating said two operating portions to their respective operating positions.

3,992,063

BRAKE PRESSURE DISTRIBUTION VALVE AND SYSTEM

Edward J. Falk, St. Louis County, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Nov. 6, 1975, Ser. No. 629,643
Int. Cl.² B60T *8/26*
U.S. Cl. 303—6 C **8 Claims**



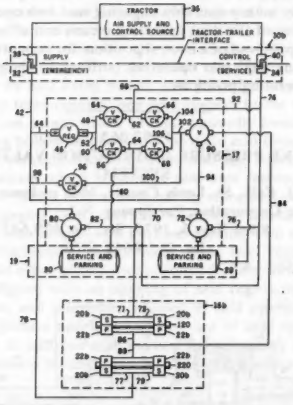
1. A brake pressure distribution valve comprising:

a housing having a cavity formed therein;
first and second fluid responsive means movable mounted in the housing, each being resiliently urged in opposite directions for relative movement therebetween;
first sealing means mounted on the first fluid pressure responsive means for sealingly separating a first atmospheric portion at a first end of the cavity from a pressurized fluid portion of the cavity;
second sealing means mounted on the second fluid pressure responsive means for sealingly separating the pressurized fluid portion of the cavity from a second atmospheric portion at a second end of the cavity opposite the first end;
first port means for permitting passage of pressurized fluid into the pressurized fluid portion of the cavity;
second port means for permitting passage of the pressurized fluid out of the pressurized fluid portion of the cavity;
retainer means on the first fluid pressure responsive means for engaging the second fluid responsive means for unitary movement of the first and second fluid pressure responsive means;
metering means in the pressurized fluid portion of the cavity in proximity with the first fluid pressure responsive means for metering the flow of pressurized fluid between the first and second port means;
the first fluid pressure responsive means includes an elongated portion extending from the pressurized fluid portion of the cavity into the second atmospheric portion of the cavity; and
the second fluid pressure responsive means is movably mounted on the elongated portion.

3,992,064
VEHICLE BRAKE SYSTEM

Michael L. Carton, Chesterfield; Larry C. Huetsch, Mehlville, and George W. Stearns, Florissant, all of Mo., assignors to Wagner Electric Corporation, Parsippany, N.J.

Filed Dec. 4, 1975, Ser. No. 637,644
Int. Cl.² B60T *13/28*
U.S. Cl. 303—7 **20 Claims**

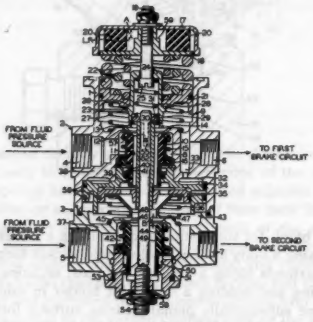


1. A vehicle brake system comprising:
an air receiving portion including means for receiving air from a supply source;
a valve portion connected to the air receiving portion including a first plurality of one-way check valve means separated for independently operating on the air received and for securing the air operated on from returning to the receiving portion;
a storage portion connected to the valve portion including a plurality of storage means separated for independently receiving the air from the first separated valve means, respectively, and for storing the air received;
a second plurality of one-way check valve means, corresponding to the first valve means, separated in the valve portion and cooperatingly connected to the separated storage means, respectively, for selecting air from one of the storage means, for independently operating on the selected air, for securing the selected air from returning to its respective storage means and for further securing the selected air from paassing to another of the storage means; and
a brake portion including service brake means connected for receiving air from the storage means and also including parking brake means connected for receiving the selected air from the storage means.

3,992,065
BRAKE CONTROL VALVE DEVICE FOR FLUID PRESSURE OPERABLE DUAL BRAKE SYSTEMS FOR MOTOR VEHICLES

Ewald H. Pekrul, Nienstedt, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed Sept. 19, 1975, Ser. No. 614,874
Claims priority, application Germany, Sept. 25, 1974, 2445700
Int. Cl.² B60T *15/04*
U.S. Cl. 303—28 **5 Claims**



1. A brake control valve device for controlling supply of actuating fluid pressure to and release thereof from respective first and second brake circuits of a fluid pressure operable brake system, said control valve device comprising:
a. first valve means having one position in which a first fluid pressure supply communication to the first brake circuit is closed and a first fluid pressure release communication therefrom is open;
b. manually operable means for exerting an actuating force on and causing movement of said first valve means from said one position to a second position in which said first fluid pressure release communication is closed and said first fluid pressure supply communication is opened;
c. second valve means having one position in which a second fluid pressure supply communication to the second brake circuit is closed and a second fluid pressure release communication therefrom is open;
d. connecting means connected to and movable with said manually operable means and carrying coaxially thereon an operating member normally disposed in an axially spaced-apart position relative to said second valve means, said operating member being movable, by movement of said connecting means, to an abutting position relative to said second valve means for transmitting said actuating force thereto and causing movement of said second valve means from its said one position to a second position in which said second fluid pressure release communication

is closed and said second fluid pressure supply communication is opened;

e. first fluid pressure responsive means operable responsively to fluid pressure in said first supply communication for exerting an opposing force on said manually operable means in opposition to said actuating force for effecting operation of said first valve means to a lap position in which both said first supply and release communications are closed upon equalization of the opposing forces acting on said manually operable means; and

f. second fluid pressure responsive means threadably carried by a portion of said connecting means in abutting relation with said operating member and movable in unison therewith, said second fluid pressure responsive means being operable responsively to fluid pressure in said second supply communication for exerting an opposing force on said connecting means in opposition to said actuating force for effecting operation of said second valve means to a lap position in which both said second supply and release communications are closed upon equalization of the opposing forces acting on said operating member;

g. said second fluid pressure responsive means being axially adjustable on said connecting means for varying the spaced-apart position of said operating member relative to said second valve means and accordingly causing operation of said second valve means, relative to said first valve means, to occur in advance of, concurrently with or in arrears of said first valve means.

3,992,066

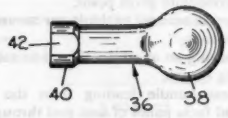
SPHERICAL BEARINGS AND PARTS THEREFOR

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Division of Ser. No. 499,940, Aug. 23, 1974, Pat. No. 3,900,294. This application Apr. 3, 1975, Ser. No. 564,955

Int. Cl.² F16C *23/00*

U.S. Cl. 308—72 **3 Claims**



1. A blank for a spherical bearing rod end having an outer member, an intermediate member of yieldable material within and supported by said outer race member and an inner race operationally supported by said intermediate member, the outer member comprising having a radially outward flowed uniformly cold formed annular area having improved tensile strength and the annular area having two enlarged faces, each face having an inwardly disposed annular dished portion in which the material has been cold worked and flowed uniformly to an outer periphery of said faces to form the uniformly cold formed annular area.

3,992,067

CONFERENCE DESK

William C. Kane, 1541 Metropolitan Ave., Bronx, N.Y. 10462

Filed Nov. 12, 1975, Ser. No. 631,056

Int. Cl.² A47B *47/00*

U.S. Cl. 312—194 **1 Claim**

1. Combination conference table and desk comprising,

a pedestal containing drawers, a single leg,

a desk top, one end of said top fitting over and resting on said pedestal, the other end of said top resting on said leg, said one end of said top having a generally rectangular shape, said other end of said table top being enlarged and having an extending curved configuration so that a plurality of persons may sit around said table top in comfortable writing position,

wherein said curved configuration extends in the same direction that the drawers extend when pulled out there being sufficient space between the extending portion and the drawers for the desk occupant to sit,

said single leg being centrally located under the said end of the table top having said curved configuration, and

a shield centrally mounted under the table top in front of the space for the principal desk occupant,

whereby a plurality of visitors may be accommodated in comfortable writing positions with the desk owner the central figure of the conference.

3,992,068

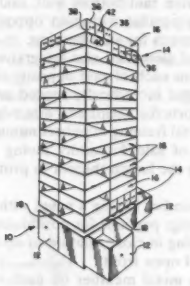
DEVICE FOR STOCKING, FILING AND DISPLAYING SMALL ARTICLES

Renee Galton, 7, rue Fallempin, Paris, France (75015)

Filed July 23, 1973, Ser. No. 381,699

Int. Cl.² A47F *5/02*

U.S. Cl. 312—202 **6 Claims**



1. A stand for containing and displaying a plurality of small articles comprising

a. base means for supporting said device,

b. a plurality of individual discs stacked in superimposed position on said base means for rotation relative thereto, each of said discs including a flat bottom wall and a plurality of upstanding partitions which are spaced to define a plurality of compartments and which define the height of the disc, at least one side of each compartment being entirely open,

c. rod means extending vertically through said discs for defining in each of said disc compartments smaller sub-compartments of predetermined size,

d. cases adapted to contain the articles to be displayed inserted in each sub-compartment and exposed at the exterior of the disc for display and removal of the articles, and

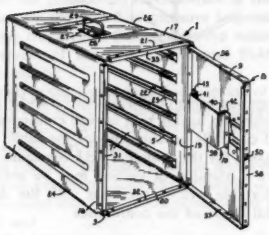
e. means for supporting said discs on said base so as to provide rotating movement of said discs relative to said base.

3,992,069

FOOD TRAY CARRIER

Gary Kitterman, 4100 Riverside St., Kansas City, Mo. 64150

Filed June 23, 1975, Ser. No. 589,454
Int. Cl.² A47B 95/02
U.S. Cl. 312—244 5 Claims



1. A food tray carrier comprising:

a. a housing of molded plastic having a bottom wall and opposite side walls and a rear wall and a top wall defining an open front shell, said side walls and said bottom wall and said top wall each having a forwardly facing edge portion;

b. a plurality of elongated projections integral with and depending from said bottom wall, said projections being substantially parallel with said opposite side walls and defining supports for said housing;

c. a plurality of elongated ribs integral with and extending inwardly from each of said opposite side walls, said ribs being arranged in vertically spaced and aligned pairs to define supports for peripheral side edges of food trays;

d. elongate metal framing members mounted on and enclosing certain of said forwardly facing edge portions for substantially the length thereof to protect and strengthen same;

e. a closure member having a panel with peripheral flanges on certain edge portions for positioning in the open front of said housing in close relation to said framing members to close said open front;

f. an elongate metal member on each of one of said side walls of the housing and an adjacent edge portion of the closure member panel to strengthen and stiffen same and hinge means connecting said metal members to swingably mount the closure member relative to said housing;

g. latch means mounted on said closure member and engageable with a framing member on the edge portion of the other of said side walls for retaining said closure member in a position closing the open front of said housing;

h. said top wall has a depressed portion therein between said rear wall and the forwardly facing edge portion of said top wall and extending between said opposite side wall substantially parallel with the forwardly facing portion of said top wall;

i. a handle is mounted on said top wall and positioned within said depressed portion; and

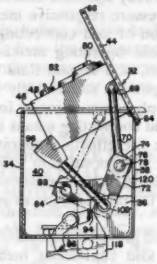
j. a metal member is mounted on an inwardly facing surface of said panel of said closure member and cooperates therewith to define a compartment for refrigiration material for cooling the interior of the housing.

3,992,070

LOCKABLE FLIP-UP INSTRUMENT PANEL

Robert C. Dunn, Lockport, and Joseph M. Jania, Bolingbrook, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed May 15, 1975, Ser. No. 578,048
Int. Cl.² A47B 88/00, 81/00; E05C 17/32
U.S. Cl. 312—320 3 Claims



1. A lockable flip-up instrument panel apparatus for use on a tractor type vehicle comprising:

a rectangular box-like housing having four walls, a floor panel having an aperture, and an open top;

a lid having an inner and an outer surface that may be pivotally mounted on said rectangular housing;

a pod securely affixed to the inside surface of said lid, said pod having a first and a second side wall member attached to the lid and a facia panel as the front surface of said pod for carrying instruments;

a linking means composed of a first and a second link pivotally attached to the body at a first end and to the inner surface of the lid at the second end of the linking arm, having the first and second linking arms connected at a common intermediate pivot point;

an operating handle secured to the lower mounting point of said linking means;

a locking tab having an aperture affixed to said lower link of said linking means;

a wiring harness bundle leading from the instruments housed in said facia panel of said pod through said aperture in said housing to said vehicle.

3,992,071

PROCESSES FOR ACTIVATING S-1 CATHODE

Frederick R. Hughes, Lancaster, and Robert C. Crissman, Leola, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 1, 1975, Ser. No. 564,197
Int. Cl.² H01J 9/02
U.S. Cl. 316—18 1 Claim

1. A process for making an S-1 cathode in an image intensifier tube with a tube preparation and activation stages including the following steps:

Exhaust tube to 5 microns pressure;

Heat to 425° Centigrade;

Backfill with oxygen to 500 microns pressure;

Bake for 10 minutes;

Exhaust to 5 microns pressure;

Bake for 110 minutes;

Cool to room temperature;

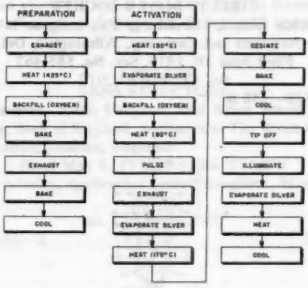
Heat faceplate to 50° Centigrade;

Evaporate silver on faceplate until light transmission thereof is reduced to 85%;

Backfill with oxygen to 225 microns pressure;

Heat to 80° Centigrade until light transmission of faceplate is a minimum;

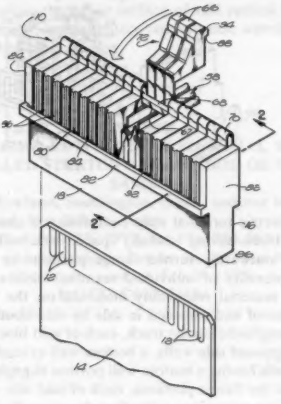
Apply normal polarity current pulses between anode and cathode of 550 volts and 26 milliamperes for one second intervals separated by at least one second until light transmission by faceplate reaches 98–100% of original value;
Exhaust to 5 microns pressure;
Evaporate silver until light transmission of faceplate decreases 95%;
Heat tube to 175° Centigrade;
Using thermionic current as monitor cesiate cathode until peak current is obtained;
Shut off cesion generator and continue to bake at 175° Centigrade until second peak is reached;



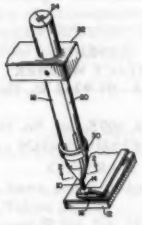
Cool to room temperature;
Tip-off all removable processing units except the silver evaporation unit;
With a normal operating potential between the anode and cathode illuminate the cathode sufficiently to induce a measureable photocurrent;
Evaporate silver until the photocurrent peaks and falls off 50%;
Heat entire tube until the photocurrent reaches a peak value; and
Cool to room temperature.

3,992,072
ELECTRICAL CONNECTOR
John W. Anhalt, Orange, and James H. Curley, Costa Mesa, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Feb. 23, 1976, Ser. No. 660,690
Int. Cl.² H01R *13/38*
U.S. Cl. 339—97 P **11 Claims**

1. An electrical connector for connecting a plurality of conductors each having a metallic core covered with insulation to conductive elements on a mating connection member comprising:
an elongated insulative housing;
said housing having a conductor receiving side and a mating side;
a row of spaced contact receiving cavities in said housing extending from said conductor receiving side to said mating side;
contacts mounted in said cavities, each said contact having a contacting section on said mating side and a termination section on said conductor receiving side;
said termination section of each said contact embodying insulation displacing, core penetrating jaws;
a row of individual conductor terminating caps on said conductor receiving side each aligned with a corresponding one of said contact termination sections;
a relatively thin hinge section pivotally connecting each of said caps to said housing, each said cap being movable from a first position overlying the end of its respective termination section to a second position out of a alignment with said termination section; and
each said cap emboying means for forcibly inserting a conductor into the jaws of its corresponding contact to electrically connect said conductor to said contact when said cap is pivoted from said second position to said first position, each said conductor being individually removable from its contact when the corresponding cap thereof is pivoted from said first position to said second position.



3,992,073
MULTI-CONDUCTOR PROBE
Leonard S. Buchoff, Bloomfield, and Chris A. Dalamangas, Union, both of N.J., assignors to Technical Wire Products, Inc., Cranford, N.J.
Filed Nov. 24, 1975, Ser. No. 634,529
Int. Cl.² H01R *13/00*
U.S. Cl. 339—108 TP **20 Claims**



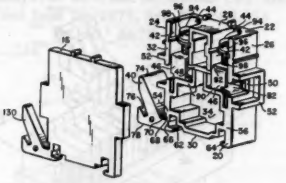
1. The multi-conductor probe having a probe end adapted to contact a body to be probed comprising
a first element of electrically insulative elastomer and a plurality of elements of electrically conductive elastomer contiguous with and bonded to the first element such that each of said plurality of elements is electrically insulated from any other of said plurality of elements, each of said plurality of elements being electrically connectable to external electrical test means at a point remote from the probe end, the first element and said plurality of elements being substantially coterminous at the probe end.

3,992,074

SEGMENTED ELECTRIC TERMINAL STRIP

Phillip R. Rymer, Leicester, N.C., assignor to Square D Company, Park Ridge, Ill.

Filed Mar. 12, 1975, Ser. No. 557,852
Int. Cl.² H01R 9/22
U.S. Cl. 339—198 GA 8 Claims



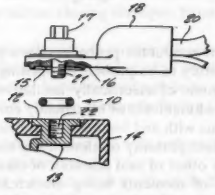
1. An electric terminal strip comprising: a channel-shaped mounting track having laterally spaced side walls that have respective outwardly turned flange portions at their upper edges. a plurality of individual terminal blocks of renitent insulating material removably mounted on the track transversely thereof and disposed in side-by-side abutting relation in a row lengthwise on the track, each of said blocks including a pair of opposed side walls, a bottom wall extending between the side walls having a bottom wall portion engaging the upper surfaces of the flange portions, each of said side walls having respective leg extensions extending downwardly from a juncture with said block outwardly of the respective flange portions, said leg extensions terminating at their lower extremities in respective end portions having inturned flanges disposed beneath and engaging the respective flange portions of the track, said end portion of one of said leg extensions comprising a lever including its respective inturned flange and a lever portion extending outwardly and upwardly therefrom said one leg extension including a fulcrum disposed between said juncture and said end portion, said lever portion terminating in a free end disposed above a horizontal plane including said fulcrum, said lever portion having an inner surface facing and spaced from the side wall associated with said one extension and an outer surface facing away from said side wall and comprising a force engageable surface whereby force applied inwardly thereto is effective to flex said lever about said fulcrum to a position whereat the flange thereof is moved outwardly from its position beneath its associated flange portion on the track to permit rotary movement of the terminal block relative to the track during removal and installation of the block on the track.

3,992,075

CONTACT WASHER

Robert C. Cannarsa, 164 - 07 92nd St., Howard Beach, N.Y. 11414

Filed Apr. 10, 1975, Ser. No. 566,721
Int. Cl.² H01R 11/26
U.S. Cl. 339—232 1 Claim



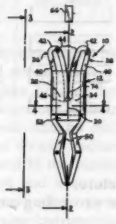
1. In a battery system including an electric storage battery having at least one terminal electrode with a flat upper surface and an internally threaded hole, a battery cable for connection to said terminal electrode, a lug terminating said battery cable, a special washer connected to said lug and having a flat lower surface and a screw coupled to said lug and extending through said washer for engaging said threaded hole, the improvement comprising, a ring-shaped contact washer with a circular cross section for insertion between the upper surface of said terminal and the lower surface of said special washer said contact washer being made of a metal alloy comprised of tin and lead, and capable of being deformed when pressed between said two flat surfaces to change its contact to said surfaces from a line contact to a broad surface contact.

3,992,076

CIRCUIT BOARD SOCKET

Glenn Harlan Gluntz, Harrisburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 10, 1975, Ser. No. 585,467
Int. Cl.² H01R 13/12
U.S. Cl. 339—258 R 7 Claims



1. A circuit board socket formed of conductive metal stock and comprising an elongate, hollow body having a rectangular transverse cross section; a pair of folded cantilever springs extending from opposed sides of the body at one end of the body, each spring including first and second arms, said first arms extending away from the body and diverging from each other outwardly of the body, each spring being bent back in a bight toward said one end of the body, each second arm extending from a bight back into the interior of the body, there being contact sufaces on the ends of the second arms, said pair of cantilever springs being normally stressed so that said contact surfaces engage each other within the body, the second arms being convexly bowed toward each other; a pair of circuit board mounting legs extending from opposed sides of the body at the other end of the body; and a tab integral with another side at and closing said other end of the body.

3,992,077

SEPARABLE ELECTRICAL CONNECTION ARRANGEMENT

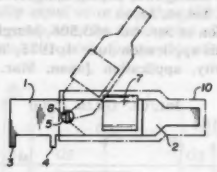
Hermann Schwartz, Pfaffikon, Switzerland, assignor to Siegfried Peyer, Bach, Switzerland

Filed June 25, 1975, Ser. No. 590,295
Claims priority, application Switzerland, July 1, 1974, 8978/74
Int. Cl.² H01R 11/22
U.S. Cl. 339—288 R 7 Claims

1. Separable electrical connection arrangement having two terminal elements, one of said elements (1) being an elongated flat strip, the other of said elements (2) having an elongated flat strip portion (6) and a bent-over cover flap (7) extending at least in part essentially in parallel to the flat strip portion (6);

and interengaging pivot means (5, 8) linking said elements pivotally together to enable swinging of the first element between the flat strip portion (6) and the bent-over flap (7) of the second element (2) upon relative pivoting

movement between said elements (1, 2), said interengaging pivot means comprising an opening (5) formed in one



of said elements and a bent-over lug (8) formed on the other element, and shaped to fit into said opening (5).

3,992,078

LENS STRUCTURE

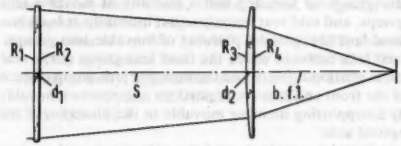
David Freeman, South Croydon, and Brian Blandford, East Molesey, both of England, assignors to The Rank Organisation Limited, London, England

Filed May 6, 1975, Ser. No. 574,879

Claims priority, application United Kingdom, May 6, 1974, 19923/74

Int. Cl.² G02B *3/00*

U.S. Cl. 350—2 **13 Claims**



1. An optical objective for the infra-red wave band, consisting of front and rear simple positive lens elements, each made of Germanium, said elements being axially spaced by an air separation lying between 0.8F and 1.2F, where F is the equivalent focal length of the complete objective, the rear surfaces of the two elements each being plane or having minimal curvature convex to the front and the front surfaces of the front and rear elements each being convex to the front with radii of curvature greater than 5F and 2F, respectively, and less than the radii of curvature of the rear surfaces of said respective front and rear elements.

3,992,079

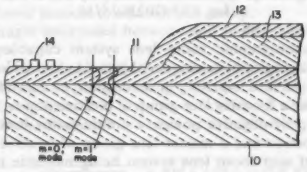
FREQUENCY TUNABLE ACOUSTOOPTIC MODE FILTER

Thomas G. Giallorenzi, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 11, 1975, Ser. No. 639,681

Int. Cl.² G02B *5/14*

U.S. Cl. 350—96 C **6 Claims**



1. An optical waveguide structure for co-linear acoustooptic interactions through which guided wave mode conversion and coupling is achieved; which comprises,

an optical material substrate,

an optical waveguide formed upon said substrate,

a mode separating optical waveguide formed on and along a portion of said optical waveguide and,

a surface acoustic wave transducer formed on said optical waveguide for producing a surface acoustic wave which travels along the upper surface of said optical waveguide and extends approximately one acoustic wavelength into said optical waveguide.

3,992,080

RETROREFLECTIVE SHEET MATERIAL WITH CONTROLLED STRETCH AND METHOD OF MAKING SAME

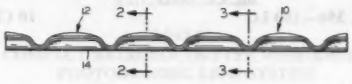
William P. Rowland, Southington, Conn., assignor to Reflexite Corporation, New Britain, Conn.

Filed June 13, 1975, Ser. No. 586,663

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G02B *5/124*

U.S. Cl. 350—103 **5 Claims**



1. An elongated composite retroreflective sheet material with controlled stretch comprising a first strip of transparent flexible synthetic resin having a multiplicity of minute cube corner formations on one surface thereof and a second strip of flexible backing material of lesser length than said first strip when in a relaxed condition and bonded to said first strip with said cube corner formations disposed adjacent said second strip, said composite retroreflective sheet material being puckered in the relaxed condition thereof, and stretchable to a smooth surface condition with the elimination of the puckered condition providing a visual measurement of the desired degree of elongation of the composite material to avoid distortion of the cube corner formations said strips being bonded along the longitudinal edges thereof.

3,992,081

LIQUID CRYSTAL DISPLAY DEVICE WITH ENHANCED CONTRAST

Yoshio Yamazaki, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 254,575, May 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 43,150, June 3, 1970, abandoned. This application Sept. 13, 1974, Ser. No. 505,875

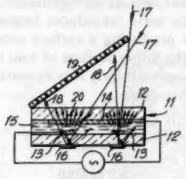
Claims priority, application Japan, June 11, 1969, 44-45580; July 4, 1969, 44-52680; July 15, 1969, 44-55570

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **6 Claims**

1. In a liquid crystal display device having an upper and a lower plate each having a liquid crystal material between a conductive electrode thereon with the electrode on the lower plate being segmented in the form of characters and wherein a mirror surface is positioned behind and only behind each

conductive segment on said lower plate to reflect light reaching said lower plate, the improvement comprising a shield so



positioned with respect to said device as to intercept incident light specularly reflected by said mirror surface.

3,992,082

COMPOUND LIQUID CRYSTAL INDICATOR SCREEN

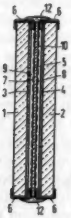
Helmut Katz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 29, 1975, Ser. No. 545,108

Claims priority, application Germany, Jan. 29, 1974, 2404127

Int. Cl.² G02F 1/28

U.S. Cl. 350—160 LC **10 Claims**



1. A compound liquid crystal indicator screen having at least two liquid crystal cells arranged in tandem directly behind one another in the direction of a light beam, said screen comprising a pair of outer glass plate members with at least one very thin transparent carrier foil member disposed therebetween, each of said foil members being of a material selected from a group consisting of glass, mica and similar things and having a thickness substantially thinner than the plate members and no greater than 500 μm; means for spacing the members to form a stack of spaced members; and means consisting of glass solder for sealing the margins of the members to provide a plurality of spaced chambers with adjacent chambers being separated by a foil member, each chamber containing a liquid crystal layer to form one of the liquid crystal cells, each of said foil members having a pair of transparent electrode patterns disposed on opposite surfaces, each electrode pattern having at least one lead extending to the margin of the foil member and each of said plate members having a conductive layer on a surface facing the foil member with at least one layer being transparent with each layer having a lead extending to a margin of the plate member so that an electrical field can be selectively imposed on the liquid crystal layer of each cell to operate each cell both independently of the other cells and simultaneously therewith.

3,992,083

VARIABLE FOCAL LENGTH OPTICAL SYSTEM OF SUPER-HIGH MAGNIFICATION RATIO

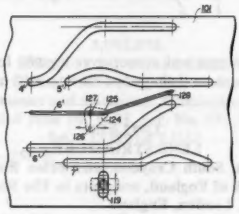
Kimio Tanaka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 453,508, March 21, 1974, abandoned. This application June 4, 1975, Ser. No. 583,557

Claims priority, application Japan, Mar. 23, 1973, 48-33312

Int. Cl.² G02B 15/00

U.S. Cl. 350—184 **3 Claims**



1. A zoom lens system of high variable magnification ration, comprising:

a front zoom portion and a rear zoom portion arranged along an optical axis, said front zoom portion including a lens group for focusing and a plurality of movable lens groups, and said rear zoom portion including at least one fixed lens group and a plurality of movable lens groups;

a fixed lens barrel in which the fixed lens group of the rear zoom portion is fixed, and the movable lens group of each of the front and rear zoom portions is supported movably by a supporting member movable in the direction of the optical axis;

a cam barrel rotatable around the optical axis with respect to the fixed lens barrel, said cam barrel having a first cam groove group engageable with an engaging portion of the supporting member of the front zoom portion, and a second cam groove group engageable with an engaging portion of the supporting member of the rear zoom portion, each groove of the first and second cam groups having a portion which acts on the supporting member and a portion which does not act on the supporting member, so that when the acting portion of the cam groove of one of the cam groove groups engages with the engaging portion the non-acting portion of the cam groove of the other cam groove group engages with the engaging portion, zooming of one of the zoom portions can be successively performed after the completion of zooming of the other zoom portion by rotation of the cam barrel.

3,992,084

ZOOM LENS SYSTEM ALSO CAPABLE OF ULTRA-CLOSEUP PHOTOGRAPHY

Soichi Nakamura, Kamakura, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed May 6, 1974, Ser. No. 467,582

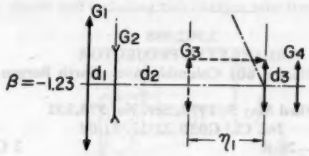
Claims priority, application Japan, May 11, 1973, 48-51577

Int. Cl.² G02B 15/18

U.S. Cl. 350—186 **5 Claims**

1. A photographic zoom lens system capable of ultra-closeup photography having an object side and an image side, the lens system comprising in succession, as viewed from the object side, a focusing lens group of positive power, a variator lens group of negative power, a compensator lens group of positive power and a master lens group of positive power, a portion of said zoom lens system being movable to provide minimum and maximum zooming focal length configurations of the lens system, at least one of said lens groups being movable independently of the zooming operation to a predeter-

mined position to form an ultra close-up configuration wherein said focusing lens group, said variator lens group and said compensator lens group together in said ultra close-up configuration form a composite lens group having a focal length substantially equal to or less than the focal length of said master lens group with the focal point of said composite lens group, as viewed from the image side of the lens system,



lying on the side of the focusing lens group facing away from the variator lens group, wherein said one lens group comprises the compensator lens group, and wherein the compensator lens group is movable from its position in said minimum zooming focal length configuration of the lens system toward the image side of the lens system to reach said predetermined position.

3,992,085

LARGE APERTURE WIDE ANGLE LENS SYSTEM EMPLOYING AN ASPHERICAL SURFACE

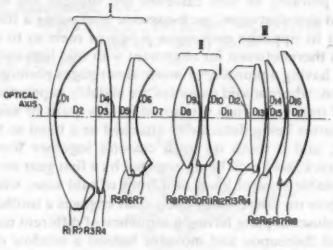
Kikuo Momiyama, Chofu, Chofu, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 369,504, June 13, 1973, abandoned. This application Feb. 21, 1975, Ser. No. 551,716

Claims priority, application Japan, July 4, 1972, 47-66359

Int. Cl.² G02B *3/04, 9/64*

U.S. Cl. 350—189 **10 Claims**



1. A large aperture wide angle lens which employs one aspheric surface comprising:

a first lens group having a negative refractive power overall and including at least one convex lens,

a second lens group having an overall positive refractive power and including at least a concave lens and a convex lens, and

a third lens group of the retro-focus type having an overall positive refractive power in which a meniscus concave lens with a convex plane thereof faces an image side and is located nearest to said second group,

a diaphragm interposed between said second and said third groups,

at least one surface of the lenses in said third group at the rear of said diaphragm being aspheric, said aspheric surface being formed in a shape defined by X and Y which are obtained when Y is varied in the following equation:

$$X = \frac{Y^2}{Ri + Ri\sqrt{1-\left(\frac{Y}{Ri}\right)^2}} + BY^4 + CY^6 + DY^8 + EY^{10} + \ldots$$

$$B\,(Ni' - Ni) < 0, \quad \frac{0.001}{f} < \left|B\,(Ni' - Ni)\right| < \frac{10}{f}$$

$$C\,(Ni' - Ni) < 0, \quad \frac{0.001}{f} < \left|CNi' - Ni\right| < \frac{10}{f}$$

wherein X represents an axis taken along the direction along which a light beam proceeds on the optical axis, Y is an axis to be perpendicular to said X - axis, Ri is the paraxial curvature radius at the vertex of the aspheric surface, Ni designates the refractive index of the medium in front of the aspheric surface, Ni' designates the refractive index of the medium at the rear of the aspheric surface, and f represents the focal distance of the overall lens system, the following conditions being satisfied by the wide angle lens;

$$\left.\begin{array}{l} 2.74\,f \leqslant L < 3.07\,f \\ 1.65\,f \leqslant |f_I| < 2.46 \end{array}\right\} \text{but } f_I < 0$$

$$\begin{array}{l} 1.67\,f \leqslant f_{II} < 2.07\,f \\ 1.30\,f \leqslant f_{III} < 1.40\,f \end{array}$$

wherein L represents the overall length of the lens system, f_I designates the focal distance of the first group, f_{II} is the focal distance of the second group and f_{III} is the focal distance of the third group.

3,992,086

COMPACT RETROFOCUS-TYPE WIDE-ANGLE PHOTOGRAPHIC LENS SYSTEM

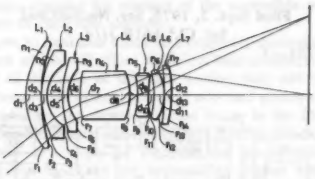
Nobuo Yamashita, Tama, Japan, assignor to Olympus Optical Co., Ltd,. Tokyo, Japan

Filed July 12, 1974, Ser. No. 488,205

Claims priority, application Japan, July 14, 1973, 4878910

Int. Cl.² G02B *9/64*

U.S. Cl. 350—214 **2 Claims**



1. A compact retrofocus-type wide-angle photographic lens system comprising seven lens components, a first lens component being a positive meniscus lens with its convex surface positioned on the object side, a second lens component being a negative meniscus lens with its convex surface positioned on the object side, a third lens component being a negative meniscus lens with its convex surface positioned on the object side, a fourth lens component being a positive lens, a fifth lens component being a negative lens, a sixth lens component being a positive lens with its concave surface positioned on the object side, and a seventh lens component being a positive lens with its concave surface positioned on the object side, and said compact retrofocus-type wide-angle photographic lens system having the following numerical values:

$r_1 = 87.306$			
$r_2 = 162.911$	$d_1 = 14.28$	$n_1 = 1.72$	$\nu_1 = 42.08$
$r_3 = 97.551$	$d_2 = 0.357$		
$r_4 = 36.310$	$d_3 = 5.356$	$n_2 = 1.58913$	$\nu_2 = 61.11$
$r_5 = 114.111$	$d_4 = 14.60$		
$r_6 = 39.524$	$d_5 = 5.356$	$n_3 = 1.58913$	$\nu_3 = 61.11$
$r_7 = 78.687$	$d_6 = 11.283$		
$r_8 = -73.327$	$d_7 = 48.775$	$n_4 = 1.6779$	$\nu_4 = 53.36$
$r_9 = -76.694$	$d_8 = 7.141$		
$r_{10} = 230.504$	$d_9 = 10.926$	$n_5 = 1.7618$	$\nu_5 = 27.11$
$r_{11} = -143.783$	$d_{10} = 4.606$		
$r_{12} = -50.050$	$d_{11} = 8.927$	$n_6 = 1.6968$	$\nu_6 = 55.62$
$r_{13} = -1724.112$	$d_{12} = 0.536$		
$r_{14} = -113.904$	$d_{13} = 7.855$	$n_7 = 1.56873$	$\nu_7 = 63.16$

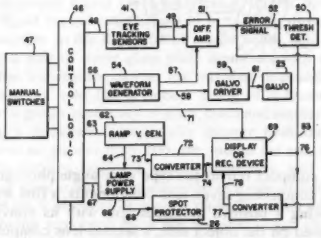
$f = 100$, $f_{123} = -70.29$, B.f. = 134.05

wherein reference symbols r_1 through r_{14} respectively represent radii of curvature of respective lens surfaces, reference symbols d_1 through d_{13} respectively represent thicknesses of respective lenses and airspaces between respective lenses, reference symbols n_1 through n_7 respectively represent refractive indexes of respective lenses, ν_1 through ν_7 respectively represent Abbe's numbers of respective lenses, reference symbol f represents the focal length of the lens system as a whole, reference symbol f_{123} represents the total focal length of the first, second and third lens components, and reference symbol B.f. represents the back focal length.

3,992,087
VISUAL ACUITY TESTER

Merton C. Flom, and Anthony J. Adams, both of Oakland, Calif., assignors to Optical Sciences Group, Inc., San Rafael, Calif.

Filed Sept. 3, 1975, Ser. No. 609,962
Int. Cl.² A61B 3/14
U.S. Cl. 351—7 **9 Claims**



1. A device for measuring visual acuity both under normal conditions as well as following medical or visual stress comprising

means for projecting a moving spot of light in the view of a subject,

means for attenuating the intensity of said spot of light,

eye tracking means for sensing the position of the eyes of the subject while said spot of light is present,

difference means for comparing the position of the eyes of the subject and the position of said spot of light including detector means for sensing divergence therebetween,

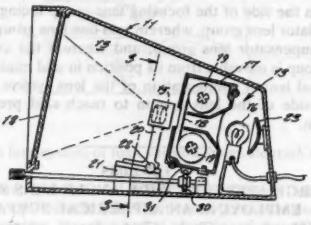
converter means for converting said intensity of said spot of light at the instance of said divergence, to visual acuity units, and

display means for displaying the output of said converter means.

3,992,088
BLANKETTE PROJECTOR

William C. Blanke, 601 Columbia Ave., North Bergen, N.J. 07047

Filed May 5, 1975, Ser. No. 574,532
Int. Cl.² G03B 23/12, 21/04
U.S. Cl. 353—26 R **2 Claims**



1. In a music projector, the combination of a case having a transluscent screen on its front side, and a mechanism inside said case for projecting a music sheet page image upon a rear side of said screen for being viewed from a front side of said screen, said mechanism including a lens, a first electric lamp with a reflector, a space between said lens and lamp into which a plurality of film cassettes are slidable for selected alignment therebetween, each cassette containing a film strip wound at its opposite ends upon a pair of reels so to expose a portion therebetween for alignment with said lens and lamp, said film having a plurality of music sheet pages photographed thereupon, wherein said cassettes are slidably supported upon a pair of transverse rods supported in side walls of said case, said cassettes being detachably attached to a band so to slide together, and a tooth on each cassette together forming a toothed rack, said rack being engaged by a first gear on a shaft of a rotatable control knob at a front of said case, wherein a second gear on said control knob shaft engages a toothed rack of a transluscent plate having a sequence of different numerals imprinted thereupon and movable behind a window opening in said case front wall, and a second lamp inside said case being behind said plate and aligned with said window opening.

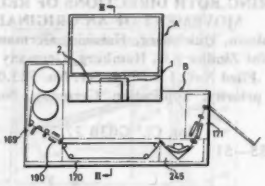
3,992,089
READER-PRINTER APPARATUS WITH MULTIPLE SUPPLY ROLLS AND CHARGING DEVICES

Hiroshi Hirose, Machida; Hiroshi Yamada, Ichikawa; Nachio Seko, Sagamihara; Junji Kurokawa, Yokohama; Masumi Ikesue, Tokyo; Shozo Shimomura, Tokyo; Hideo Yamazaki, Tokyo; Hiroki Takeda, Tokyo; Tetsuo Sakurai, Sagamihara; Hiroshi Mano, Yokohama; Minolu Fukuda, Yokohama; Setsuo Soga, Mitaka, and Yukio Noguchi, Yokohama, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Oct. 10, 1975, Ser. No. 621,544
Claims priority, application Japan, Oct. 14, 1974, 49-117956
Int. Cl.² G03G 15/00; G03B 13/28, 27/60
U.S. Cl. 355—5 **17 Claims**

1. A reader-printer apparatus comprising, in combination, a projection optical system; a copying system having a duplication exposing position; a screen; and a reflector device in said optical system selectively operable to project an image of

an original either onto said screen or to said duplication exposing position; said copying system including means operable to mount at least two rolls of paper or different respective widths, a copy sheet feed device switchable between the rolls of paper to be fed in accordance with the required width of copy sheets to be produced from the original, a paper cutting device operable to sever the paper fed from a roll into copy sheets of the required length, a charging device receiving the copy sheets and including two charges selectively energizable



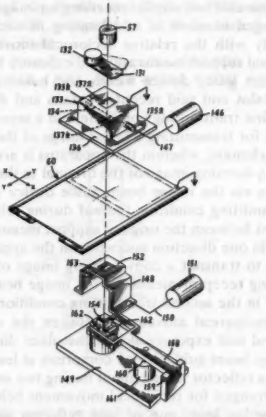
in accordance with the copy sheet size and quality, a copy sheet suction and conveyor device receiving copy sheets from said charging device and conveying the copy sheets to said duplication exposing position, a developing device receiving exposed copy sheets delivered thereto from said duplication exposing position by said suction and conveying device, and a copy sheet ejecting device receiving the developed copy sheets from said developing device and ejecting the copy sheets from said apparatus.

3,992,090

OPTICAL APPARATUS FOR SELECTIVELY PRODUCING RIPPLED MESSAGE IMAGES IN AREAS OF SPECULAR SURFACED PHOTOPLASTIC FILM AND ERASING SUCH IMAGES FROM SUCH AREAS FOR REUSE

Gordon Lysle, Greenlawn, N.Y., assignor to Microx Corporation, Hauppauge, N.Y.

Filed Feb. 27, 1975, Ser. No. 553,520
Int. Cl.² G03G 16/00
U.S. Cl. 355—9 **9 Claims**



1. In an optical camera and image processing apparatus for selectively producing rippled message images in frame areas of specular surfaced photoplastic film by image patterned electrostatic charge and heat deformation and effectively heat erasing any such images at higher temperatures for re-recording the erased frame areas, the combination with

a. means temporarily to support a record sheet having a light-reflective outer face that bears an image which is to be reproduced optically upon a film portion with said means permitting ready removal of the sheet for replacement by another record sheet;

b. means to direct light rays upon the image-bearing outer face of the record sheet when temporarily supported by said means;

c. film supporting means mounted in a fixed position and having an optical aperture therein behind which may be temporarily supported in a transverse plane of fixed position a photoplastic film section having a specular surface in which may be produced a rippled image of the record sheet image when at least a portion of this specular surface is exposed in the optical aperture to patterned electrostatic charge and rippling heat deformation;

d. optical means in front of said film supporting apertured means to direct a recording image-bearing light beam reflected from the image-bearing face of the supported record sheet directly to said aperture and including in the optical path thereof an objective lens unit located a focal distance from said record sheet supporting means that is adapted to project the image-bearing beam in focus upon the film specular surface portion when exposed in the aperture;

e. means interposed in the optical path between said lens unit and said aperture and in the vicinity of the latter while being spaced therefrom to produce electrostatic charges throughout the entire area of said aperture simultaneously and impose them upon the film specular surface portion when exposed in said aperture with this imposition being effected in a latent pattern corresponding to the darker areas of the image borne by the light beam and with this film surface being irradiated directly by said light beam; and

f. powered equipment and controls to operate various components of the apparatus; of

g. a lateral platen located immediately back of the film section transverse plane for providing rearward support for the zones of the section of such film which will margin the specular surface area thereof that is to be exposed in the optical aperture, said platen having an opening opposite said optical aperture whereby the back of this section of the film that will be opposite its specular surface area is accessible;

h. a metallic block of readily heatconductive material movably mounted in a manner to be moved forward into said platen opening for contact of the accessible area of the back of such film section;

i. means to heat said block to a relatively moderate temperature which will effect sufficient heat conduction softening of the area of this film section that will be located between said optical aperture and said platen opening as to produce the desired rippled image in the film surface of this film area while this surface is being irradiated; and

j. means selectively to increase the temperature of this metallic block to an appreciably higher temperature which will by heat conduction contact with this film area intervening said optical aperture and platen opening raise the temperature thereof sufficiently to erase the image rippling of this film area without film destructive heating thereof for re-recording of this film area.

3,992,091

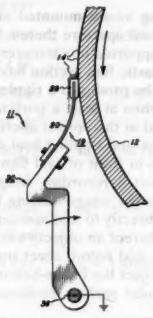
ROUGHENED IMAGING SURFACE FOR CLEANING

Donald J. Fisher, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 16, 1974, Ser. No. 506,135
Int. Cl.² G03G 21/00
U.S. Cl. 355—15 **2 Claims**

1. In an electrostatographic image reproducing apparatus including a selenium material imaging surface developable with toner material, and further including a cleaning blade for deformably engaging said imaging surface to remove such toner material therefrom, the improvement in said apparatus

wherein said imaging surface has a substantially uniformly and continuously roughened surface with a surface roughness pattern averaging 3 to 5 microns in lateral dimensions, but not substantially exceeding 20 microns in lateral dimensions and



2 microns in depth, said roughness pattern reducing friction between said cleaning blade and said imaging surface in comparison to a smooth imaging surface without adversely affecting image reproduction.

3,992,092

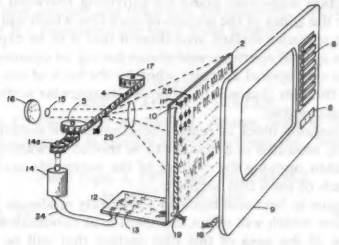
MICROFILM INSTRUCTION SYSTEM

Harry Place, Ridgewood, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 21, 1975, Ser. No. 551,886

Int. Cl.[2] G03B *27/52*; G09B *3/00*, *7/00*

U.S. Cl. 355—41 **8 Claims**



1. A photographic instruction display system comprising:

a photographic film having N frames, where N is an integer greater than one, each of said N frames containing a plurality of information data and a plurality of optically encoded data each related to a different one of said pluraity of information data, each of said plurality of information data being associated with a different sequence of M frames dispersed throughout said N frames, where M is an integer greater than one but less than N, each of said sequence of M frames providing a different logical sequence of said plurality of informaiton data in the form of questions;

first means for projecting said plurality of information data upon a viewing screen;

second means for projecting said pluraity of encoded data upon a matrix of photo responsive means;

a plurality of third means each associated with a different one of said pluraity of information data in each of said N frames; and

fourth means coupled to said second means and said plurality of third means responsive to actuation of at least one of said plurality of third means by an operator to indicate his answer to one of said questions in one of said N frames and that one of said projected pluraity of encoded data associated with said one of said question to advance said photographic film to the next succeeding frame of one of the associated one of said sequence of M frames as directed by said associatecd projected plurality of encoded data.

3,992,093

APPARATUS FOR THE PREPARATION OF COPIES DURING BOTH DIRECTIONS OF RELATIVE MOVEMENT OF AN ORIGINAL

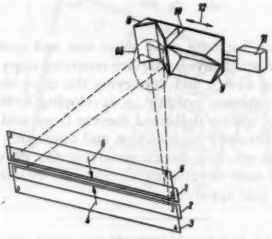
Hans Jakobson, Quickborn, Holstein, Germany, assignor to Lumoprint Zindler KG, Hamburg, Germany

Filed Nov. 12, 1974, Ser. No. 523,064

Claims priority, application Germany, Nov. 23, 1973, 2358370

Int. Cl.[2] G03B *27/70*

U.S. Cl. 355—51 **26 Claims**

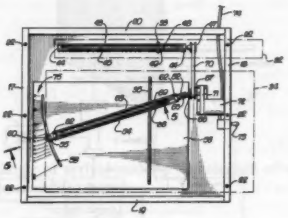


1. An apparatus for the preparation of copies of an original, comprising an apparatus housing, an exposure slot associated with said housing, an illumination device including a light source within said housing arranged to direct light to said exposure slot in said housing, original support means on said housing for holding the original to be copied and said original support means and said exposure slot arranged to effect relative reciprocal movement therebetween, receptor means located within said housing for receiving an image of the original and arranged to move in said housing in one direction synchronously with the relative reciprocal movement between said original support means and said exposure slot, at least one image beam guide device within said housing between said exposure slot and said receptor means and displaceable between a first transmitting condition and a second transmitting condition for transmitting a linear image of the original to the receptor element, wherein the apparatus is arranged to transmit a copy-forming image of the original to the moving receptor means via the image beam guide device arranged in the first transmitting condition thereof during relative reciprocal movement between the original support means and said exposure slot in one direction and wherein the apparatus is further arranged to transmit a copy-forming image of the original to the moving receptor means via the image beam guide device arranged in the second transmitting condition thereof during relative reciprocal movement between the original support means and said exposure slot in the other direction, wherein said image beam guide device comprises at least one objective lens and a reflector arrangement having two separate reflector means arranged for reciprocal movement behind said at least one objective lens, one of said reflector means having an effective 90° angle for true-to-line picture reversal and the other of said reflector means having an angle of reflection different from 90° for line reversal and image reversal in the line, an imaging slot within said housing in the path of the image of the original passing to said receptor means said one of said reflector means being arranged with its edges at right-angles to said exposure slot and said other of said reflector means being arranged with its edges parallel to said imaging slot.

3,992,094
CONTROLLED-DISTORTION PHOTOCOPYING APPARATUS

Kenneth E. Adcock, 10082 Jon Day Drive, Huntington Beach, Calif. 92646

Filed Nov. 24, 1975, Ser. No. 634,543
Int. Cl.² G03B 27/10
U.S. Cl. 355—84 8 Claims

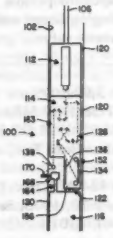


1. A controlled-distortion photocopying apparatus comprising a base having a surface provided with parallel first and second carriage guideways, first and second film carriages slideable along said guideways, respectively, and a film mask movable into and out of a position overlying said surface and having an exposure slit normal to the paths of movement of said film carriages; characterized by the provision of means for propelling said carriages along said guideways comprising a bifurcate driving mechanism having forks synchronously driven from a common source; one of said forks paralleling the path of movement of said first film carriage, and the other of said forks being adjustably positionable in a plane paralleling the plane of movement of said second film carriage, to any of a series of positions at an acute angle to said first fork.

3,992,095
OPTICS MODULE FOR BOREHOLE STRESS MEASURING INSTRUMENT

Jerold L. Jacoby, Long Beach, and Clyde E. Williamson, Torrance, both of Calif., assignors to TRW Systems & Energy, Redondo Beach, Calif.

Filed June 9, 1975, Ser. No. 584,806
Int. Cl.² G01B 11/16; E21B 49/00; G03H 1/02
U.S. Cl. 356—32 4 Claims



1. A holographic optics module for a holographic instrument to be positioned within a borehole for determining the stress in the borehole wall, comprising:

an elongate generally tubular body which extends lengthwise of the borehole in which the instrument is positioned and having a laterally facing window at one end of said body;

a holographic recording system in said body including means for holding a holographic recording medium having a field of view in a transverse direction of said body through said window, whereby when the instrument is positioned in a borehole a surface region of the borehole wall is situated in said field, and holographic optics for receiving a laser beam, splitting said beam into scene and reference beams, and directing said scene and reference beams into said field and toward said holder, respectively, to illuminate said recording medium and wall region with said reference and scene beams, respectively, to record first and second holograms of said wall region in succession on said recording medium and thereby produce on said recording medium a double exposure hologram of said wall region;

said holographic optics comprising a plurality of optical elements;

said recording system including means adjustably mounting said optical elements within said body for initial alignment of said optics, and means for firmly securing said elements in fixed positions in said body to preserve said alignment during instrument operation in the borehole;

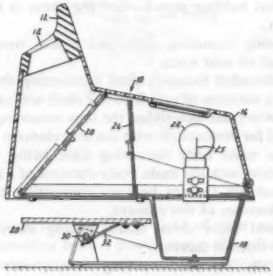
said instrument including a drill module to be located at one end of said optics module and having a drill head which is extendable and retractable into and from said field to drill a stress relief hole in said borehole wall region in the interval between recording of said first and second holograms; and

said window being located at said one end of said optics module body and inset toward the axis of the body to provide outwardly of the window a recess in which said drill head may extend and retract.

3,992,096
DETECTING SYSTEM

Robert J. Oliveira, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 4, 1975, Ser. No. 601,384
Int. Cl.² G01N 15/02
U.S. Cl. 356—36 26 Claims



1. Method of detecting light-interacting domains in a preselected size range supported by a medium which comprises:

disposing said medium between a source of multipoint illumination and a scintillation detecting means;

illuminating said medium with a multiplicity of discrete light beams directed through said medium toward said scintillation detecting means;

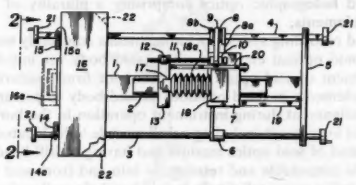
causing relative motion between said light beams and said medium, or alternatively, when said medium is spaced from said source of multipoint illumination, causing relative motion between said scintillation-detecting means and said light beams, said medium or both;

whereupon scintillation is detectable when light-interacting domains in the preselected size range are present in the medium.

3,992,097
MOUNTING DEVICE FOR PRINTING COPYING CAMERA

Gerald A. Jensen, Wayzata, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed May 16, 1975, Ser. No. 577,988
Int. Cl.² G03B 27/36, 27/38
U.S. Cl. 355—56 4 Claims



1. A camera mounting device for copying photographic prints comprising a rigid frame structure,

a print holding panel mounted at one end of said frame structure to provide an operating station and adapted to hold a photographic print to be copied,

means for supplying light to the print being held by said panel when such print is being photographed,

a pair of parallel elongated main drive shafts extending substantially the full length of said frame structure and journaled for rotation thereon with one end of each shaft disposed at said operating station,

control means connected to said shafts at said operating station for producing rotation of said drive shafts in both directions,

a central guide track mounted on said frame structure between said shafts and disposed substantially normal to said print holding panel when the same is in operative position,

a main body mounting slide and a lens mounting slide mounted on said track,

a screw threaded focusing shaft connecting the two slides whereby rotation of said focusing shaft will vary the spacing between said two slides, the lens-mounting slide being adapted for connection with the lens element of a camera and the main body mounting slide being adapted for connection with the main body element of a camera with an adjustable camera bellows connecting the lens and body elements of the camera,

one of said main drive shafts having externally screw threads formed thereon,

an internally threaded bushing mated with said screw threads of the main drive shaft and connected to the main body slide to move both of said slides on said track to adjust the distance of the main camera body from the print holding panel,

a driving pulley slidably mounted on the other main shaft but having a rotatable driving connection therewith,

means rigidly connecting said pulley to said main camera mounting slide for back and forth sliding movement therewith,

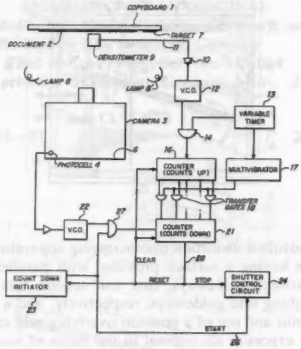
a belt and pulley driving connection between said driving pulley and said screw threaded focusing shaft to rotate said focusing shaft only when said second main shaft is rotating, and

frictional means for maintaining positive anti-backlash connection between the adjustment shafts and the members driven thereby to accurately adjust and maintain the position of the respective slides in response to predetermined increments of rotation of said two main shafts.

3,992,098
SYSTEM FOR DIGITALLY CONTROLLING EXPOSURE TIME OF CAMERA

John S. Wirtz, Henrietta, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed July 2, 1975, Ser. No. 592,492
Int. Cl.² G03B 27/74, 27/78
U.S. Cl. 355—68 9 Claims



1. A system for actuating a camera shutter during a controllable exposure interval, wherein said camera photographs an object having a given background density comprising:

a. a densitometer for measuring said background density before the commencement of said exposure interval;

b. counter means for storing a count therein proportional to said background density;

c. a first counter control means for inserting a count into said counter means proportional to said background density as measured by said densitometer;

d. object illumination intensity measuring means;

e. second counter control means for changing the count within said counter means at a rate proportional to the illumination intensity measured by said illumination intensity measuring means; and

f. shutter control means for opening said shutter at the beginning of said exposure period, and for closing said shutter when the changing count with said counter means reaches a predetermined value.

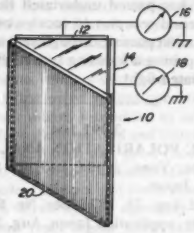
3,992,099
SOURCE DISCRIMINATOR FOR MEASURING ANGLE OF ARRIVAL AND WAVELENGTH OF RADIANT ENERGY

Richard H. Laughlin, Richardson, Tex., assignor to Varo, Inc., Garland, Tex.

Continuation of Ser. No. 424,059, Dec. 12, 1973, abandoned.
This application July 10, 1975, Ser. No. 594,756
Int. Cl.² G01N 21/22
U.S. Cl. 356—73 5 Claims

5. A source discriminator system for measuring both the angle of arrival and wavelength of plane wave radiant energy which is radiated by a source and incident upon said discriminator from an unknown direction and at an unknown wavelength, said system comprising in combination: diffraction grating means positioned in said system to diffract said incident plane wave radiant energy into at least two diffracted plane waves, the first of said diffracted plane waves corresponding to a first order of diffraction and the second of said diffracted plane waves corresponding to a second order of diffracton; first and second planar detector means respectively responsive to said diffracted plane waves for producing corre-

sponding first and second electrical output signals and indicator means responsive to said first and second output signals to



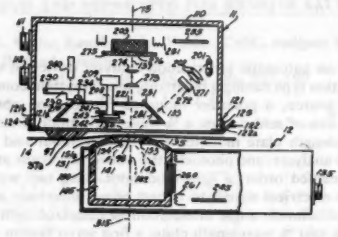
indicate the angle of arrival and the wavelength of said incident plane wave radiant energy.

3,992,100

PAPER MACHINE OPTICAL MONITORING DEVICE WITH INTEGRAL STANDARDIZING OPTICAL WINDOW

Fred P. Lodzinski, Port Edwards, and Leonard R. Dearth, Appleton, both of Wis., assignors to Nekoosa Papers Inc., Port Edwards, Wis.

Filed Feb. 4, 1974, Ser. No. 438,993
Int. Cl.[2] G01N *21/00*; D21C *7/00*; G01V *1/28*
U.S. Cl. 356—73 31 Claims



1. Apparatus for obtaining a quantitative measure of an optical property of a moving web of substantially homogeneous sheet material, which comprises:

a. an optical monitoring device having a web receiving region for receiving in operative relation thereto a web of sheet material moving along a web path,

b. said optical monitoring device having an optical system with photometric sensor means capable of providing two essentially independent output signals and with two distinct light energy paths each including light source means, spectral response filter means and said photometric sensor means, said photometric sensor means being responsive to light energy received from the web receiving region after impingement on sheet material in said region,

c. each of said two distinct light energy paths having substantially a common spectral response characteristic sufficient to characterize said optical property but being respectively arranged for collecting said light energy from the web receiving region after impingement on said web under respective substantially differentiated conditions so as to provide respective essentially independent output signals from said photometric sensor means such as to essentially characterize two essentially independent optical response parameters of the sheet material and such as to characterize the optical property with substantially greater accuracy than any characterization of said optical property by either one of such optical response parameters taken by itself,

d. automatic digital computer means connected on line with said optical monitoring device and coupled with said photometric sensor means for receiving therefrom said respective essentially independent output signals in accordance with the respective essentially independent optical response parameters and automatically operable on the basis of said output signals to calculate a quantitative indication of said optical property,

e. said monitoring device including an optical window member disposed on the opposite side of the web receiving region from said light source means, and having an extended web-engaging surface adjacent the web receiving region for slidably supporting the web of sheet material as it moves through said web receiving region, said optical window member comprising a translucent diffusing material of substantial absolute reflectance and of substantial absolute transmittance,

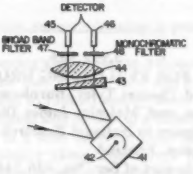
f. one of the light energy paths being a reflectance sensing light path for sensing of reflectance of the sheet material as backed by said translucent diffusing material of said optical window member and the other of said light energy paths being a transmittance sensing light path for sensing the transmittance of the sheet material and the translucent diffusing material of said optical window member in series.

3,992,101

SCANNING OPTICAL SPECTRAL ANALYZER EMPLOYING PLURAL DETECTORS

James C. Dapper, and Paul A. Niemi, both of Cincinnati, Ohio, assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Jan. 13, 1975, Ser. No. 540,531
Int. Cl.[2] G01J *3/30*
U.S. Cl. 356—83 36 Claims



12. Apparatus for scanning a field of view and enabling spectral information from a point source of optical radiation in the field to be derived comprising dispersion means for the optical radiation, means having a narrow instantaneous field of view for optically scanning the field of view, first detector means responsive to energy of the source imaged by the scanning means for deriving a first signal having an amplitude versus time variation that is a convolution of dispersed spectral energy from the source and the dispersion means while the field of view is being scanned, second detector means while the field of view is being scanned, second detector means displaced by a predetermined distance from the first detector means, said second detector means being responsive to substantially only one predetermined wavelength of energy of the source imaged by the scanning means for deriving a second signal indicative of the occurrence time of the predetermined wavelength from the source being imaged on the first detector means, and means responsive to the first and second signals for deriving a third signal having an amplitude versus time variation that is correlated with the amplitude versus wavelength variation of the source.

3,992,102

PHOTOELECTRIC SMOKE DETECTOR WITH MEANS FOR ADJUSTING THE AMOUNT OF LIGHT PROJECTED INTO THE DETECTION REGION

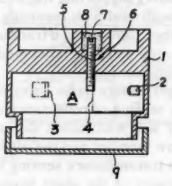
Shigeru Kajii, Kawasaki, Japan, assignor to Hochiki Corporation, Tokyo, Japan

Filed Apr. 11, 1975, Ser. No. 567,173

Claims priority, application Japan, Apr. 17, 1974, 49-42210[U]

Int. Cl.² G01N *21/00*

U.S. Cl. 356—103 **4 Claims**



1. In a photoelectric smoke detector comprising a housing with an opening for admitting smoke thereinto, a light source and a light receiving element contained in said housing whereby when the smoke enters into a detection region in said housing the quantity of the light emanated from said light source and impinged upon said light receiving element is varied to produce an electric signal, the improvement comprising a light shielding member located in said detection region for preventing the light from said light source from impinging directly upon said light receiving element, and an adjusting screw movable along the top edge of said light shielding member for adjusting the quantity of the light projected into said detection region and the quantity of light impinging upon said light receiving element, said light receiving element receiving smoke scattered light from said light source.

3,992,103

DEVICES FOR EVALUATING DROP SYSTEMS

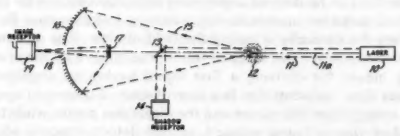
Leonard Richard Thomas Tyley, Burnham; Henry Sawistowski, Streatham, and Malcolm James Dix, Chiswick, all of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 436,744, Jan. 25, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,493

Claims priority, application United Kingdom, Jan. 30, 1973, 4500/73

Int. Cl.² G01N *15/02*

U.S. Cl. 356—102 **10 Claims**



1. Apparatus for use in the analysis of a system of dispersed particulate matter comprising:

means for producing a beam of collimated light and directing said beam of light into said system,

a first photoresponsive receptor for receiving a first two-dimensional image formed by light from said beam and producing a first signal representing the spatial variations of light intensity in said first image,

a second photoresponsive receptor for receiving a second two-dimensional image formed by light from said beam and producing a second signal representing the spatial variations of light intensity in said second image, and

optical means for causing said first receptor to receive only light which has passed undeviated through said system and said second receptor to receive only light which has been deviated in passing through said system, said optical means comprising a focusing system disposed in the path of said deviated light.

3,992,104

AUTOMATIC POLARIZATION ANALYZER DEVICE

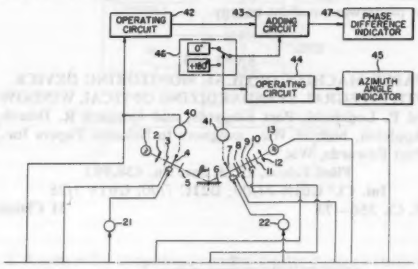
Sakuji Watanabe, Yono, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Aug. 25, 1975, Ser. No. 607,582

Claims priority, application Japan, Aug. 29, 1974, 49-98335

Int. Cl.² G01N *21/40*

U.S. Cl. 356—117 **13 Claims**



1. In an automatic polarization analyser device of the two modulation type having a polarizing optical system comprising a light source, a polarizer mounted for rotation about the optical axis of said system, a ¼ wavelength plate, a sample, a ½ wavelength plate mounted for rotation about said optical axis, an analyser, and photoelectric converter means arranged in the named order; a light modulator using two separable, distinct electrical signals to impart phase difference modulation and azimuth angle modulation to polarized light passed through said ½ wavelength plate; a first servo system responsive to a phase difference modulation signal in the output from said photoelectric converter means to control said polarizer until said modulation signal becomes zero; a second servo system responsive to an azimuth angle modulation signal in the output from said photoelectric converter means to control said ½ wavelength plate until said azimuth angle modulation signal becomes zero; a phase difference operating circuit for detecting the angle of rotation of said polarizer and effecting the operation of $90°+2\theta_P$ (where θ_P is the detected angle of rotation of said polarizer); and an azimuth angle operating circuit for detecting the angle of rotation of said ½ wavelength plate and effecting the operation of $|2\theta_H|$ (where θ_H is the detected angle of rotation of said ½ wavelength plate), the improvement comprising:

a third servo system for controlling said polarizer so as to change the azimuth angle thereof from +45° to −45° or from −45° to +45°;

a fourth servo system for controlling said ½ wavelength plate so as to change the azimuth angle thereof from $+\theta_H$ to $-\theta_H$ or from $-\theta_H$ to $+\theta_H$;

first detector means for detecting the angular displacement of said polarizer by +45° or −45° with respect to a reference position and for thereupon transferring from a reset condition, at which a reset sigal is produced to a set condition, at which a set signal is produced;

second detector means for detecting said angle changes by said third and fourth servo systems and thereupon producing a detection signal for transferring said first detector means to its reset condition;

first change-over means responsive to said first detector means for rendering said first and third servo system operative alternately such that upon reception of the set signal from said first detector means said first change-over means renders said first servo system inoperative but said third servo system operative and that upon reception of the reset signal from said first detector means said first change-over means renders said third servo system inoperative but said first servo system operative;

second change-over means responsive to said first detector means for rendering said second and fourth servo systems operative alternately such that upon reception of the set signal from said first detector means said second change-over means renders said second servo system inoperative but said fourth servo system operative and that upon reception of the reset signal from said first detector means said second change-over means renders said fourth servo system inoperative but said second servo system operative;

a circuit for changing the polarity of said electrical signal for said phase difference modulation upon reception of said set signal from said first detector means;

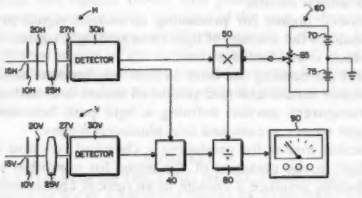
a selector circuit for producing a 0° signal when the angle of rotation of said ½ wavelength plate is of the positive sign and for producing a +180° signal when the angle of rotation of said ½ wavelength plate is of the negative sign; and

a circuit for adding the output signals from said selector circuit and said phase difference operating circuit.

3,992,105
METHOD AND APPARATUS FOR REMOTE SALINITY SENSING

Peter G. White, Rancho Palos Verdes, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Mar. 10, 1975, Ser. No. 557,199
Int. Cl.² G01J *4/04*
U.S. Cl. 356—118 **8 Claims**



1. In a method of remotely determining the degree of salinity of water at a specified point at the surface of a body thereof, the steps of:

a. electro-optically generating a first data signal representative of a first value, corresponding to the intensity of at least a finite wavelength band of the horizontally polarized component of sunlight specularly reflected from a solar glitter pattern at the specified point;

b. electro-optically generating a second data signal representative of a second value, corresponding to the intensity of at least said finite wavelength band of the vertically polarized component of sunlight specularly reflected from the solar glitter pattern at the specified point;

c. electronically operating on said first data signal and said second data signal to compute the difference between the first value and the second value;

d. electronically operating on said first data signal to compute the product of the first value and the value of a particular function of the solar zenith angle at the specified point, said particular function being a linear function of $f(\phi)$ where:

$$f(\phi) = \frac{\delta\rho_H}{\delta_s}\left(1 + \frac{\rho_V}{\rho_H}\right) - \frac{\delta\rho_V}{\delta_s}\left(1 + \frac{\rho_H}{\rho_V}\right), \text{ and}$$

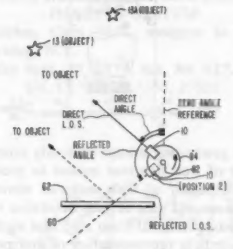
ϕ = the solar zenith angle,
ρ_H = reflectivity of the horizontally polarized radiation,
ρ_v = reflectivity of the vertically polarized radiation, and
s = salinity; and

e. electronically computing the ratio of the difference to the product, whereby a final data signal is generated, said final signal representative of the difference in salinity between said specified point and a particular calibration point at the surface.

3,992,106
ERROR CANCELLING SCANNING OPTICAL ANGLE MEASUREMENT SYSTEM

Victor Auerbach, Middlesex County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 30, 1974, Ser. No. 510,463
Int. Cl. G01b *11/26*
U.S. Cl. 356—141 **18 Claims**



1. A vehicle attitude determining system comprising in combination:

a. a radiant energy sensor scanning a prescribed field of view;

b. means for exposing said sensor to a direct line-of-sight of an object within said field of view and generating a first signal responsive to radiant energy from said object;

c. means for exposing said sensor to a reflected line-of-sight of said object at a time different from the time of exposure to said object along said direct line-of-sight and generating a second signal responsive to radiant energy from said reflected line-of-sight; and

d. means responsive to said first and second signals for calculating the angle of said line-of-sight relative to a local angular reference on said vehicle.

3,992,107
AUTOMATIC FLAT WIDTH CONTROL

Larry H. Loy, Cartersville, Ga., assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,293
Int. Cl.² G01B *11/04*, *11/02*
U.S. Cl. 356—160 **14 Claims**

1. Apparatus for the detection and measurement of a departure from a preselected width in the width of a continuously moving web of material comprising, in combination,

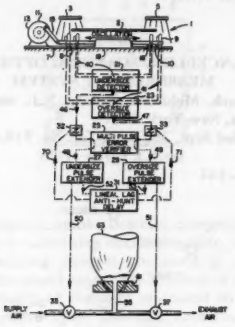
a first pair of web detector means spaced apart a distance less than the preselected width and disposed at transversely opposite locations adjacent the loci of the moving web edges;

a second pair of web detector means spaced apart a distance greater than the preselected width, disposed in substantially linear alignment with said first pair of web detector means at transversely opposite locations adjacent the loci of the moving web edges;

a support means mounting at least sensor portions of the first pair and the second pair of web detector means, disposed and arranged transversely athwart the direction of web movement;

motive means to oscillate the support means and the portions of the first and the second pairs of web detector means mounted thereon reciprocally transversely across the edges of the continuously moving web,

first signal generating means operably connected to the first pair of web detector means to produce a signal upon non-detection of web material simultaneously in both of said first pair of web detection means,



second signal generating means operably connected to the second pair of web detector means to produce a signal upon the detection of web material simultaneously in both of said second pair of web detection means,

means to translate a signal from said first signal generating means into indicia representative of and proportional to a departure from the preselected width to a width less than the preselected width, and

means to translate a signal from said second signal generating means into indicia representative of and proportional to a departure from the preselected width to a width greater than the preselected width.

3,992,108

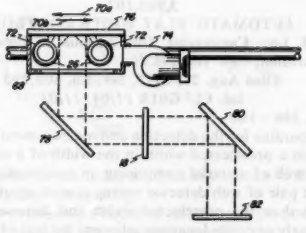
OPTICAL SYSTEM ALIGNMENT APPARATUS

Wayne L. Kidd, and Stephen C. Corona, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 439,172, Feb. 4, 1974, Pat. No. 3,904,290. This application Feb. 27, 1975, Ser. No. 553,760

Int. Cl.[2] G03G *15/00*

U.S. Cl. 356—172 **5 Claims**



1. An alignment apparatus for an optical system, including:

a movable frame member;

a light source mounted on said frame member;

an alignment member in a light receiving relationship with the light rays transmitted from said light source, said alignment member being adapted to reflect light rays therefrom;

lens means arranged to form a sample light image from the light rays reflected thereto from said alignment member; and

means for indicating the position of the sample light image to determine the alignment of the optical system, said indicating means being in a light receiving relationship with the sample light image transmitted through said lens means.

3,992,109

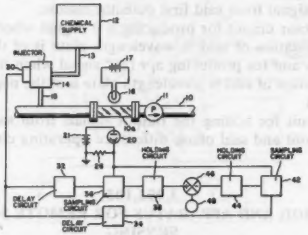
CYCLIC COLORIMETRY METHOD AND APPARATUS

Ditmar H. Bock, Boston, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Continuation of Ser. No. 341,438, March 15, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,647

Int. Cl.[2] G01J *3/50*

U.S. Cl. 356—181 **2 Claims**



2. A cyclic colorimetry system for eliminating the effects of optical system deterioration and the presence of interfering contaminants when determining and indicating the presence of a condition in a flowing fluid to be tested and comprising;

light source means;

photocell means for producing an output signal proportional to the amount of light from said light source means which is incident thereon;

means for causing the fluid to flow intermediate said light source means and said photocell means and including a transparent portion defining a light path between said light source means and said photocell means;

indicator means for producing a chemical reaction in the fluid in the presence of the tested-for condition and to thereby produce a change in an optical characteristic of the fluid only in the presence of the tested-for condition;

means for periodically causing the introduction of a predetermined quantity of said indicator means into the fluid at a point upstream of said light source means and said photocell means;

means for sensing the introduction of said indicator means into the fluid and for producing a synchronizing actuating signal;

first means responsive to said actuating signal for determining the output signal of said photocell means after a first predetermined time period and for producing a first signal output representative of the tested-for optical characteristic of the fluid to which said indicator means has been added;

second means responsive to said actuating signal for determining the output signal of said photocell means after a second predetermined time period which is longer than said first predetermined time period to permit the purging of fluid to which said indicator means has been added to produce a second signal output representative of the tested-for optical characteristic of the untreated fluid;

means for storing said first and second signal outputs; and

means for comparing said stored first and second signal outputs whereby optical effects produced by the presence

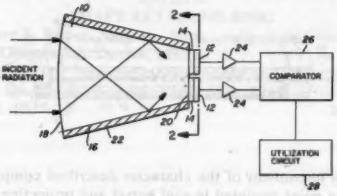
of interfering contaminants, by nonsynchronous changes in the fluid and by deterioration of the optical system comprising the light source means, the photocell means and said light path are canceled and the presence of the tested-for condition is indicated by any difference in said stored first and second signal outputs.

3,992,110

MULTI-SPECTRAL OPTICAL COMPARATOR

Richard A. Frazer, King George, and William J. Taczak, Jr., Fredericksburg, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 3, 1974, Ser. No. 503,016
Int. Cl.² G01J 3/48
U.S. Cl. 356—189 8 Claims



1. A multi-spectral optical sensor for detecting the electromagnetic energy radiated in a plurality of spectral bands by a random event source, such as a gun flash, comprising:

a collecting lens fabricated from a single piece of optical material, said lens having a truncated conical surface, an optical input surface adjacent the wide end of the truncated conical surface, and an output surface adjacent the narrow end of the truncated conical surface;

at least two optical detectors positioned proximate the output surface;

at least two optical filters, one positioned between each detector and the output surface of the lens, and each filter allowing the passage of electromagnetic radiation from a different region of the optical spectrum; and,

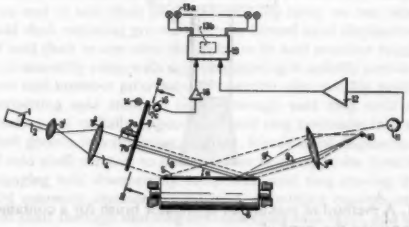
means electrically connected to said detector for comparing the detected radiation to the optical signature of a known source.

3,992,111

APPARATUS FOR DETECTING DEFECT LOCATIONS AT THE SURFACE OF A MOVING REFLECTING MATERIAL

Alfred Roulier, Neuenegg, and Walter Kamber, Mariy, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jan. 30, 1975, Ser. No. 545,468
Claims priority, application Germany, Feb. 1, 1974, 2404972
Int. Cl.² G01N 21/32
U.S. Cl. 356—200 10 Claims



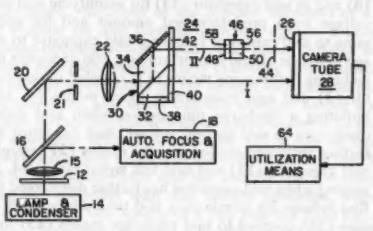
1. An apparatus for detecting defect locations at the surface of a moved reflecting material, comprising a light source, a first optical system which directs the light emanating from said light source successively at surface regions of the material located along a line extending essentially transversely with respect to the direction of movement of the material, a photoelectric transducer and a second optical system which collects the light reflected from individual surface regions of the material at the transducer, an indicator device which as a function of the intensity of the light reflected from each surface region generates a signal corresponding to the relevant surface region, the improvement comprising said light source consisting of a laser light source, said first optical system splitting up the laser beam into an essentially two-dimensional parallel bundle of light rays, the plane of which approximately perpendicularly intersects the surface of the material to be inspected and which two-dimensional parallel bundle of light rays grazingly impinges upon the material surface at a predetermined angle of incidence, and a movable diaphragm arranged in the path of the light rays impinging upon the material, said diaphragm periodically only freeing individual partial regions of the planar bundle of light rays.

3,992,112

ATTENUATING IMAGE EXTENDER FOR MULTIPLE IMAGING SYSTEM

Robert F. Adrion, Cary, N.C., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,417
Int. Cl.² G02B 5/00, 27/00
U.S. Cl. 356—201 10 Claims



1. A system for analyzing different characteristics of an optical image comprising

means for producing an image-containing light beam,

a first beam splitter in the path of said light beam for transmitting a first portion of said light beam along a first optical path and for reflecting a second portion of said light beam in a direction away from said path,

means for reflecting said second portion of said light beam along a second optical path parallel with said first optical path,

means disposed in at least one of said first and second optical paths for modifying a characteristic of the image formed along that path,

a detector for converting optical images into electrical signals, said detector having a planar target disposed in the image plane of said first optical path,

a block of transparent material disposed in said second optical path, the surfaces of said block through which light passes being planar and parallel, the distance between said surfaces being such that the image formed along that path is coplanar with said target, said block being movable in a direction perpendicular to said second path, the effective optical density presented by said block to said second path depending upon the portion of said block that is traversed by said second path, and

utilization means responsive to the electrical signal from said detector.

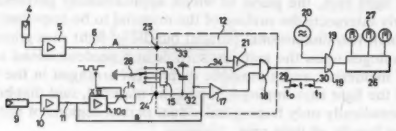
3,992,113
PHOTOMETER CIRCUITRY FOR THE DIGITAL INDICATION OF THE LIGHT ABSORPTION OF A TEST SAMPLE

Bruno Egli, Promenadenstrasse 21, Rorschach, and Manser Niklaus, Pestalozzistrasse 2, Goldach, both of Switzerland

Continuation-in-part of Ser. No. 525,618, Nov. 20, 1974, abandoned, which is a division of Ser. No. 353,965, April 24, 1973, Pat. No. 3,879,135. This application Apr. 21, 1975, Ser. No. 570,134

Int. Cl.² G01N *21/22*

U.S. Cl. 356—206 **7 Claims**



1. A photometer for providing an indication of the light absorption properties of a test sample comprising:

test signal means (**4, 5**) for providing a first voltage proportional to the intensity of a light beam emerging from the test sample (**3**);

comparison signal means (**9, 10**) for providing a second voltage proportional to the intensity of a light beam applied to the test sample;

capacitor means including a capacitor (**13**), amplification means (**10*a***) coupled to said comparison signal means (**9, 10**) and to said capacitor (**13**) for amplifying said second voltage by a predetermined amount and for applying same to said capacitor to charge said capacitor to a voltage in excess of said second voltage, said capacitor means including first sensing means (**17**) coupled to said capacitor (**3**) and said comparison signal means (**9, 10**) for initiating a discharge time period when said capacitor discharges to said second voltage, said capacitor means further including second sensing means (**21**) coupled to said capacitor (**13**) and said test signal means (**4, 5**) for sensing when said capacitor has further discharged to said first voltage for terminating said time period; and

means (**26**) coupled to said capacitor means (**13**) for providing the discharge time period of the capacitor as an indication of the light absorbing properties of the test sample.

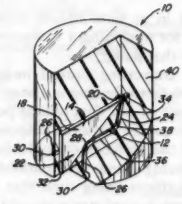
3,992,114
SPRING WIRE CLIP-TYPE SPECIMEN STAND

Orval W. Wade, 6621 S. Wellington Court, Littleton, Colo. 80121

Filed Aug. 4, 1975, Ser. No. 601,513

Int. Cl.² G01N *21/16*

U.S. Cl. 356—244 **11 Claims**



1. A clip for standing metallurgical specimens on edge while being encapsulated which comprises: a length of spring wire bent at a point midway between its ends to produce a V-shaped crotch joining a pair of substantially identical but oppositely curved generally S-shaped limbs in side-by-side relation, said limbs including oppositely arched portions diverging from the crotch and converging at points remote therefrom to define a pair of heels biased into engagement with one another and adapted to squeeze a plate-like specimen therebetween, and said limbs including foot-like portions diverging from the heels that terminate in spaced toes positionable in coplanar relation with a point on the bottom edge of the specimen misaligned therewith to define a tripod stand therefor.

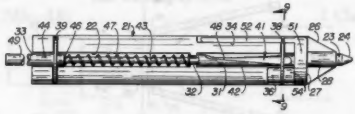
3,992,115
SELF-CONTAINED CLOSURE FOR WRITING INSTRUMENTS AND THE LIKE

Craig F. Culver, 201 Ware Road, Woodside, Calif. 94062

Filed Nov. 10, 1975, Ser. No. 630,265

Int. Cl.² B43K *9/00, 24/00*

U.S. Cl. 401—106 **10 Claims**



1. An instrument of the character described comprising a barrel, a point mounted in said barrel and projecting from a first end of said barrel, a cap shaped to fit over said point, an arm attached to said cap, a shaft attached to said arm, said barrel formed with a longitudinally extending opening to receive said shaft, means mounting said shaft in said opening for longitudinal and also oscillatory movement relative to said barrel between a first position with said cap angularly displaced relative to said point, a second position aligned with said point but displaced outwardly of said point and a third position covering said point, and manually operable means to move said shaft longitudinally outwardly relative to said first end of said barrel.

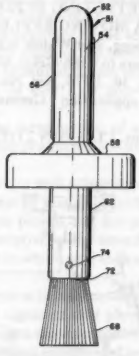
3,992,116
APPLICATOR BRUSH AND METHOD OF MAKING SAME

Kenneth A. Fomby, 402 Lindsay St., Gainesville, Tex. 76240

Division of Ser. No. 338,384, March 5, 1973, Pat. No. 3,895,877. This application Apr. 23, 1975, Ser. No. 570,844

Int. Cl.² A46B *3/02*

U.S. Cl. 401—129 **2 Claims**



1. A method of making an applicator brush for a container comprising the steps of:

a. providing a mold cavity having a portion to receive liquified plastic to unitarily form a hollow handle, with a closed end portion, and a hollow, open end stem portion,

with an enlarged screw threaded cover intermediate the length of the handle and the stem portions, said handle, said stem and said cover having a common axis,

b. further providing an enlarged hollow socket in the open end of the stem portion,

c. providing a brush head with the bristles integrally bonded together near one end thereof, of a size and shape to be complementally received in the enlarged hollow socket,

d. applying heat to the lower end of the socket to curve the plastic material inwardly to secure the brush head in the socket, and

e. passing a fastener transversely through the stem, the enlarged socket and the bonded portion of the brush head to further secure the brush head within the socket.

3,992,117

SHAFT RETAINING RING

Theodore F. Ristau, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1975, Ser. No. 562,508
Int. Cl.² B25G *3/00*; F16D *1/00*; F16G *11/00*
U.S. Cl. 403—14 **2 Claims**

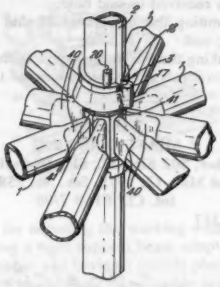
1. A shaft disengageably retained in a member having an aperture receiving said shaft, a radially inwardly facing circular retaining groove having a predetermined depth in said member aperture, a radially outwardly facing circular retaining groove having a predetermined depth in said shaft, a substantially circular resilient split retaining ring positioned in said retaining grooves when said grooves are radially aligned, end portions of said ring having substantial length extending outwardly from the normal circle of said ring, said ring having a dimension to occupy a portion of each of said grooves in interference contact with said shaft and said member resisting relative axial movement therebetween, an assembly ramp on one end of said shaft and a disassembly ramp on one side of said shaft retaining groove whereby forced axial displacement of said shaft in one direction relative to said member engages said assembly ramp with said ring moving it radially outwardly into said member groove to an assembly-disassembly position permitting said shaft to move through said ring until said grooves are radially aligned and said ring contracts into said shaft groove in a retaining position, forced axial displacement of said shaft relative to said member in an opposite direction engaging said disassembly ramp with said ring moving it to said assembly-disassembly position permitting movement of said shaft through said ring disconnecting said shaft, and said ring end portions positioning said ring in said member groove engaging said groove along its entire length assuring radial movement of said ring when engaged by said ramps.

3,992,118

SCAFFOLDING JOINT

Egidius Henrikus Gerardus Slegers, Helmond, Netherlands, assignor to SGB Group Limited, Surrey, England

Filed Oct. 9, 1974, Ser. No. 513,313
Claims priority, application Netherlands, Oct. 10, 1973, 7313914
Int. Cl.² E04G *7/06*
U.S. Cl. 403—171 **13 Claims**



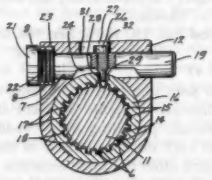
13. A scaffold structure comprising (a) a plurality of elongated upright members; (b) at least one pair of cup-like members along the length of each of said upright members, the lower of the cup-like members of a pair being fixed to the upright member and forming therewith an upward-opening annular space, the upper of the cup-like members of a pair being slidable on and forming with the upright member a downward-opening annular space, said upper cup-like member being provided with an axially extending slot of sufficient depth to clear a protrusion on the upright member and permit sliding thereover, said upper cup-like member having a sloping upper surface engagable with said protrusion; (c) a plurality of elongated horizontal members; (d) a pair of lateral, oppositely extending tongues at the ends of each of said horizontal members insertable into the annular space formed by the cup-like members with said upright members, whereby upon insertion of one tongue of a pair into the fixed cup-like member, a horizontal member is rigidly secured to an upright member by sliding the upper cup-like member over the second tongue of the pair and rotating said upper cup-like member to engage the sloping upper surface thereof with the protrusion on the upright member to force said upper cup-like member into tight engagement with said second tongue.

3,992,119

SHAFT COUPLING

Florian B. Recker, 802 First St., SE., Dyersville, Iowa 52040

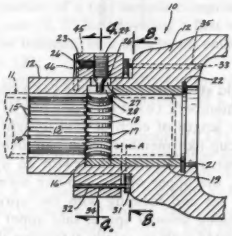
Filed Mar. 13, 1975, Ser. No. 558,136
Int. Cl.² F16B *7/00*
U.S. Cl. 403—316 **9 Claims**



1. A torque transmitting coupling comprising:

a housing;
an opening in said housing, a portion of said opening being circular and a portion of said opening being non-circular, said opening being adapted to receive a non-circular portion of a shaft;
a sleeve rotatably disposed within said circular portion of said opening, the inner configuration of said sleeve being of the same general shape as the shape of the non-circular portion of the opening in the housing;
a hole in said housing adjacent the sleeve;
a pin slidably received in said hole;
means for limiting the movement of said pin to a linear movement; and
means for linking the pin to the sleeve such that movement of the pin controls rotary movement of the sleeve.

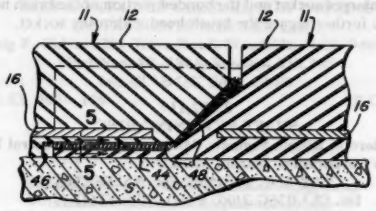
3,992,120
SHAFT COUPLING
Florian B. Recker, 802 First St., SE., Dyersville, Iowa 52040
Filed Mar. 13, 1975, Ser. No. 558,138
Int. Cl.² F16B 7/00
U.S. Cl. 403—317 **9 Claims**



1. A torque transmitting coupling comprising:
a housing;
an opening in said housing, a portion of said opening being circular and a portion of said opening being noncircular, said opening being adapted to receive a noncircular portion of a shaft;
a sleeve rotatably disposed within said circular portion of said opening, the inner configuration of said sleeve being of the same general shape as the shape of the noncircular portion of the opening in the housing;
a collar surrounding a portion of said housing;
means for interlocking the collar and the sleeve, whereby rotary movement of the collar effects rotary movement of the sleeve; and
a partially circular member being connected adjacent one end thereof to said collar and adjacent the other end thereof to said housing, said partially circular member being a substantially flat member lying in one plane.

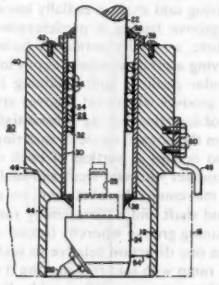
3,992,121
DECK AND ROADWAY GAP SEALING ASSEMBLY
Kermit K. Geiger, Carpentersville, Ill., assignor to Felt Products Mfg. Co., Skokie, Ill.
Filed Jan. 19, 1976, Ser. No. 650,122
Int. Cl.² E01C 11/02
U.S. Cl. 404—47 **15 Claims**

9. In a road joint assembly comprising a pair of generally horizontally disposed elongate adjacent slabs supported for relative movement, providing upper roadway surfaces and being adjacent each other, said pair of slabs being narrowly spaced from each other to define a narrow gap therebetween, an elongate end dam assembly sealingly secured to said slabs at adjacent edges and sealingly bridging said gap, said end dam assembly comprising a plurality of elongate end dam sections abutting in end-to-end serial array, each of said end dam sections comprising a pair of elongated elastomeric pads each having an upper and a lower surface and a pair of end faces respectively at opposite ends, a thin elastomeric joint membrane secured to each of said side pads along their length and sealingly spanning the space between said pads and spanning said gap, said joint membrance being substantially thinner than said side pads and assuming an upstanding arched configuration in transverse cross-section, one of said end faces being in opposed relationship with an end face of a next adjacent pad, thin membrane segments projecting longitudinally from one end of each said end dam section and having an upper surface portion for underlying and for being sealingly secured



to a lower surface portion adjacent an opposite end of the next adjoining end dam section, thereby to sealingly secure said end dam sections to each other, the improvement comprising means for enhancing securance of said end dam sections to each other, said enhancing means comprising a first layer of porous material secured to said upper surface portion of each of said thin membrane segments and a second layer of porous material secured to said lower surface portion of each next adjoining end dam section, said first and second layers of porous material confronting and engaging each other for mechanically resisting relative movement, and an adhesive for maintaining said layers in engagement with each other.

3,992,122
HIGH VELOCITY, LOW-FRICTION BORING TOOL
Robert E. L. Maxey, Irwin, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation of Ser. No. 443,889, Feb. 19, 1974, abandoned.
This application Mar. 8, 1976, Ser. No. 665,142
Int. Cl.² B23B 45/14
U.S. Cl. 408—72 B **5 Claims**



1. A high speed, low friction, boring tool for boring holes located in any machinable material by a drill jig member, said drill jig member being distinct from and positioned upon said machinable material, said tool comprising:
an elongated cylindrical shaft member;
a cutting head interchangeably mounted on said shaft member, said cutting head having variable cutting means to cut holes within a predetermined size range within said machinable material,

a housing coaxially surrounding a portion of said shaft, said housing and the surface of said shaft cooperating to define a completely enclosed annular bearing chamber,

a low friction ball bearing member coaxially disposed within said enclosed annular bearing chamber, said low friction ball bearing member engaging said shaft and said housing to permit said shaft to displace rotationally and axially on said low friction ball bearing member;

said housing member having an axially extending, cylindrical, sheath integral therewith, said sheath being disposed axially on said housing from that portion of said housing defining said enclosed annular bearing chamber, said sheath being sized to engage an aperture in said drill jig, directly, and being axially withdrawable therefrom, to guide said cutting head to said machinable material, said housing having means for bearing on said drill jig said cutting head being maintained at least a predetermined distance from said sheath.

3,992,123

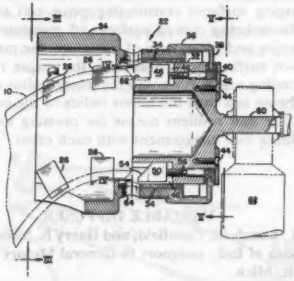
PIPE END MACHINING APPARATUS

Tadao Uyetake, Honolulu; Teikichi Higa, Pearl City; Stephen Orillo, Jr, Wahiawa, and Gregory S. Nakano, Pearl City, all of Hawaii, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 1, 1975, Ser. No. 618,725

Int. Cl.² B23B *39/00*

U.S. Cl. 408—104 **9 Claims**



1. An apparatus for machining pipe ends comprising:

an annular housing which is adapted to receive a pipe end;

a plurality of rods threaded radially through the housing and adjustable inwardly for engaging the pipe so as to enable axial alignment of the housing with the pipe end;

chuck means slidably mounted within the housing for longitudinal reciprocal movement toward and away from the pipe end;

said chuck means also being rotatably mounted within said housing;

tool means located at one end of the chuck means for machining the end of the pipe when the chuck means is rotated within said housing;

a nut which is threaded on the exterior surface of the housing;

said nut having an inwardly extending annular lip; and

said lip extending within the chuck means for slidable rotative movement so that the nut will move the chuck means toward or away from the pipe end depending on the direction in which the nut is rotated.

3,992,124

DEVICE FOR THE ADJUSTMENT OF THE WORKING WIDTH OF ROAD FINISHERS

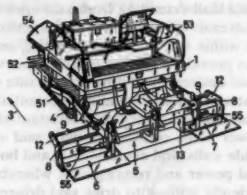
Ernst-August Schrader, Hohenfeldstr. 22, Lingen-Laxten, Germany (445)

Filed Sept. 30, 1975, Ser. No. 618,117

Claims priority, application Germany, Oct. 12, 1974, 2448665; May 16, 1975, 2522457

Int. Cl.² E01C *19/12*

U.S. Cl. 404—118 **6 Claims**



1. A device for adjusting the working width of a road finisher, comprising a main support beam adapted to be carried on the road finisher and having a central plate portion, a pair of tubes secured to each side of said main support beam central plate portion and extending laterally of the road finisher, an adjustment beam on each side of said central plate portion of said main beam having a respective interior and exterior side wall at respective ends thereof, a supporting rod having an inner end portion movable in each tube and an outer end portion secured exteriorly of the associated tube to said exterior side wall of said adjustment beam, first guide means supportably guiding the inner end portion of said supporting rod in a respective one of said tubes, and second guide means supportably guiding said adjustment beam on the exterior of each of said tubes.

3,992,125

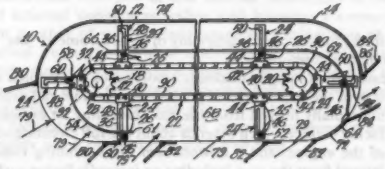
UNDERWATER POWER APPARATUS WITH FURLABLE SAILS AS WORKING MEMBERS

Rolf E. Schilling, 318 Tiverton Lane, Steger, Ill. 60475

Filed July 10, 1974, Ser. No. 487,004

Int. Cl.² F03B *13/00, 13/10*

U.S. Cl. 415—5 **5 Claims**



1. An underwater power apparatus completely disposed beneath the surface of a flowing river or stream, comprising a driven device completely disposed beneath said surface, a plurality of sail means disposed and operating completely beneath said surface for harnessing the flow of the stream to drive said device, mast means for carrying each of said sail means, at least two rotatable shafts, one shaft being spaced downstream from the other shaft, endless loop means for carrying said mast means and sail means in a circuit about said shafts, one of said shafts driving said driven device, said circuit including a power path and a return path disposed the same depth beneath said surface as said power path, and housing means rotatably carrying said shafts and containing said sail means for directing the stream flow onto said sail means on said power path and diverting the stream flow from said sail means on said return path to provide quiescent water for said return path, an opening cam track in said housing at the up-

stream end for opening said sail means, a closing cam track in said housing at the downstream end for closing said sail means, at least one cooperating surface on each of said mast means for engaging said opening and closing cam tracks to open and close said sail means, said housing means having unobstructed upstream opening means for admitting flow substantially the entire length of said power path and an unobstructed downstream opening for exiting flow from said power path, said housing having a vertical upstream side wall containing said upstream opening means, an imperforate, vertical downstream side wall extending from said upstream side wall to said downstream opening and an imperforate, vertical interior shield within said housing separating said power and return paths to provide a volume of quiescent water for said return path, said upstream and downstream side walls and said imperforate interior shield extending substantially parallel to each other, said housing including substantially horizontal upper and lower walls connecting with said upstream and downstream side walls, and enclosing top and bottom portions of each of said power and return paths, whereby the flowing stream is efficiently utilized to drive said driven device.

3,992,126

TURBINE COOLING

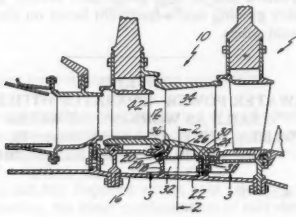
Henry B. Brown, Manchester; Eugene Cantor, Glastonbury; Francis L. DeTolla, Vernon, and Gary J. Vollinger, Simsbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 25, 1975, Ser. No. 561,712

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] F01D *5/18*

U.S. Cl. 415—115 **6 Claims**



1. In the turbine nozzle assembly of a gas turbine engine, the combination comprising:

a case which radially encloses a portion of the turbine section of the engine and which has an upstream rail extending radially inward from the case including an outwardly facing surface which extends about the full circumference of the engine, and a downstream rail extending radially inward from the case including an inwardly facing surface which extends about the full circumference of the engine;

a deformable ring which concentrically opposes the circumferential surface of the upstream rail and a downstream portion which concentrically opposes the circumferential surface of the downstream rail to form the cooling air chamber between the deformable ring and the case; and

a plurality of hollow nozzle guide vanes, each vane having a hook which engages the upstream rail of the case with the deformable ring disposed therebetween, a downstream flange which is attached to the downstream rail of the case with the downstream portion of the deformable ring trapped therebetween, and a pair of ribs which extend axially between the hook and the flange with one rib on each side of the hollow portion of the vane forming an airfoil cavity therebetween which is in gas communication with the hollow portion of the vane and forming a platform cavity between the ribs of each pair of adjacent vanes.

3,992,127

STATOR VANE ASSEMBLY FOR GAS TURBINES

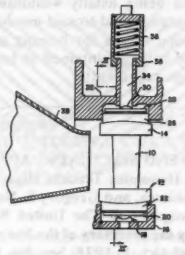
Claude R. Booher, Jr., West Chester, Pa., and Elbert H. Wiley, Wenonah, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 28, 1975, Ser. No. 563,412

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.[2] F01D *9/02, 5/14*

U.S. Cl. 415—136 **9 Claims**



1. A stator vane assembly for a gas turbine comprising a plurality of airfoil vanes, an end cap at each end of each vane, said vanes and end caps being made of a ceramic material and the end caps being disposed to support the vanes in a circular array, each vane and the end caps associated therewith having interengaging surfaces constituting pivot and seat surfaces, said surfaces being curved surfaces of compound curvature having major and minor radii of curvature, the major radius of each pivot surface being less than the major radius of the corresponding seat surface and the minor radius of each pivot surface being less than the minor radius of the corresponding seat surface and resilient means for pressing said pivot and seat surfaces into engagement with each other.

3,992,128

VARIABLE DIFFUSER

Jimmy L. Lunsford, Plainfield, and Harry N. Nelson, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

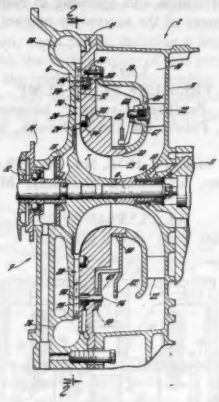
Filed June 9, 1975, Ser. No. 585,344

Int. Cl.[2] F04D *27/02*

U.S. Cl. 415—161 **4 Claims**

1. A diffuser for radial gas compressor comprising, in combination, means providing mutually spaced radial walls defining between them an annular space for diffusion of flow from a compressor rotor to an outlet; an annular cascade of variable-configuration vanes each extending between the said walls and extending downstream from a leading edge adjacent the gas entrance to the said space and defining diffusing passages between adjacent vanes; and an actuating ring extending about the axis of the diffuser movable for varying the configuration of the vanes, in which the improvement comprises a structure of each vane including a first leaf extending downstream from the leading edge pivotally mounted on the first-recited means adjacent the vane leading edge; a second leaf pivotally mounted on the first leaf adjacent the leading edge of the second leaf and extending downstream approximately to the termination of the first leaf; each leaf including ramp means extending in a direction from the leading toward the trailing edge of the leaf, the ramp means on the second leaf being oblique to that on the first leaf so that movement of a driving means along the ramp means rotates the first leaf around it pivotal mounting and rotates the second leaf around

its pivotal mounting on the first leaf so as to vary the relative angle of the leaves, thus varying the dimensional parameters



of each said diffusing passage; the actuating ring including driving means in engagement with the said ramp means.

3,992,129

CERAMIC VANE ASSEMBLY WITH END CAP INSULATOR COMPOUND LOCKING JUNCTION

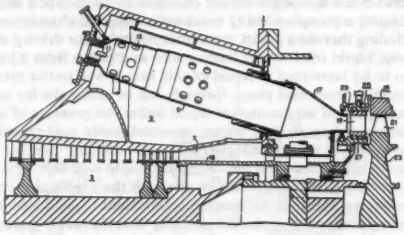
Claude R. Booher, Jr., West Chester, Pa., and Thomas J. Rahaim, Claymont, Del., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 24, 1975, Ser. No. 552,006

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F04D *29/02, 29/44*

U.S. Cl. 415—214 **12 Claims**



1. A ceramic vane assembly for an axial flow gas turbine, said vane assembly comprising a plurality of ceramic vanes disposed in an annular array;

radially inner and radially outer end caps having recesses disposed therein for receiving and positioning said vanes;

radially inner and radially outer insulator members disposed to engage said end caps;

said insulator members and end caps having mating surfaces which cooperate to generally prevent relative twisting and axial movement therebetween;

means for applying directed retention forces to position said vanes, end caps and insulator members in a predetermined relationship;

said engaged end caps and insulating members having a single predetermined combined thickness; and

at least one adjacent insulator member having a cross-section different from its adjacent insulator members thereby preventing said end caps from sliding circumferentially with respect to said insulator members.

3,992,130

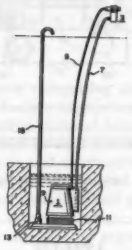
SUMP PUMP SYSTEM AND PRESSURE RESPONSIVE SWITCH ASSEMBLY THEREFOR

Bruce D. Childress, Little Rock, Ark., assignor to Jacuzzi Bros. Incorporated, Little Rock, Ark.

Filed Dec. 15, 1972, Ser. No. 315,660

Int. Cl.² F04B *49/00*

U.S. Cl. 417—36 **1 Claim**



1. A unitary switch assembly for a sump pump or the like comprising a housing, a pressure switch, a female plug and a male plug in said housing, said female plug having at least two internal connectors accessible through a wall opening of said housing and said male plug having at least two external connectors extending from said housing through an opening in a different wall thereof, whereby said switch assembly may be plugged into a conventional type wall outlet with said internal connectors exposed for connection of an external appliance, a connection from one of said internal connectors to one of said external connectors within said housing, a connection from another of said internal connectors to another of said external connectors within said housing via said pressure switch, means for coupling a source of pressure to said pressure switch, and a clip mountable on a wall of a building below a conventional wall plug and adapted to receive said housing and facilitate retention of said pressure responsive switch assembly when plugged into such wall plug.

3,992,131

LOW SPEED PUMP

James I. Masterman; James C. Solie; Jan H. Boers, and Samuel B. McClocklin, all of Owatonna, Minn., assignors to Owatonna Tool Company, Owatonna, Minn.

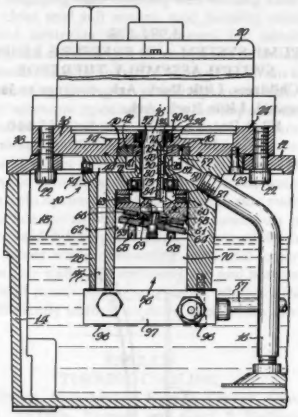
Filed Mar. 17, 1975, Ser. No. 559,311

Int. Cl.² F04B *23/12*

U.S. Cl. 417—206 **3 Claims**

1. In a two-stage pump having a motor with an output shaft, a low-pressure pump housing adjacent said motor with said output shaft projecting through said low-pressure pump housing, a gerotor pump mounted in said low-pressure pump housing with the inner rotor of said gerotor pump being keyed to said output shaft, a high-pressure pump housing mounted to said low-pressure pump housing, an angle plate pump mounted in said high-pressure housing with the angle plate being keyed to said output shaft, a single separable elongate

key on said output shaft providing said keying of both said inner rotor and the angle plate to said shaft and means on said



key for retaining said key in position relative to said output shaft.

3,992,132

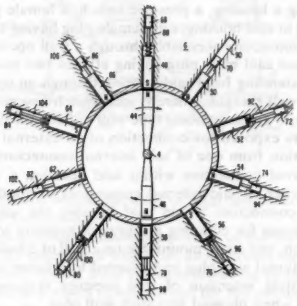
ENERGY CONVERSION SYSTEM

J. William Putt, 3278 West Cedar St., Allentown, Pa. 18104

Filed Feb. 4, 1975, Ser. No. 546,958

Int. Cl.² F04B *1/04, 17/00;* **H02K** *37/00*

U.S. Cl. 417—271 **14 Claims**



1. An energy conversion system comprising

a first set of primary magnet means disposed along an endless path,

a second set of secondary magnet means disposed along said endless path, each said secondary magnet means being transversely movable in a direction which lies transverse to said endless path,

said first set and said second set being relatively movable in a direction substantially parallel to said endless path whereby relative movement brings each primary magnet means successively into alignment with each of the secondary magnet means whereby each secondary magnet means is moved transversely by the magnetic field of the primary magnet means,

said magnet means having unchanging polarities such that throughout the relative movement of the magnet means, for each primary magnet means moving from a secondary magnet means which attracts to a secondary magnet means which repels it, there is another said primary magnet means moving from a secondary magnet means which repels it to a secondary magnet means which attracts it,

power output means operatively connected to the secondary magnet means and operable in response to transverse movement of the secondary magnet means.

3,992,133

PRESSURE FLUID PUMP

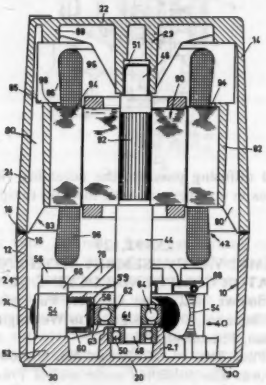
Rudolf Brunner, Baldham, Germany, assignor to Heilmeier and Weinlein, Fabrik fur Oel-Hydraulik, a KG, Munich, Germany

Filed Mar. 19, 1975, Ser. No. 559,690

Claims priority, application Germany, Mar. 21, 1974, 2413691

Int. Cl.² F04B *39/02*

U.S. Cl. 417—366 **17 Claims**



1. A pressure fluid pump comprising a container formed by end walls and a peripheral side wall defining a single fluid-tight chamber for holding a supply of liquid to be pumped under pressure, a pump assembly mounted inside said chamber and including therein a pump, a member rotatable for driving said pump, liquid inlet means leading into said pump from a location to be immersed in liquid of said supply and outlet means extending from said pump through one of said walls for conducting out of said container liquid under the pressure of said pump; a rotary electric motor mounted inside said chamber and having its rotor connected with said rotatable member for driving said pump, and means connected to said side wall for supporting the stator of said motor with the windings thereof protruding free into the space in said chamber, said side wall and said supporting means defining therebetween passageways along said side wall through which liquid of said supply will pass freely so as to flow about and cool said motor.

3,992,134

CONTINUOUSLY OPERATING PREPRESS OR FINISHING PRESS

Albert De Mets, Roeselare, Belgium, assignor to Konstruktiewerkhuize DeMets N.V., Belgium

Filed June 2, 1975, Ser. No. 582,686

Claims priority, application Germany, May 31, 1974, 2426385

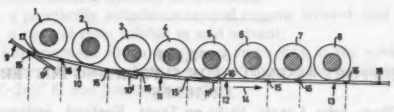
Int. Cl.² B29C *15/00;* **B30B** *5/06, 15/14*

U.S. Cl. 425—149 **3 Claims**

1. A continuously operating press or prepress comprising:

two superposed endless platen belts each formed from a plurality of articulated platens, the superposed endless platen belts defining together a material pressing travel path for material being pressed by said press or prepress,

said material pressing travel path defining a high pressure zone and an inlet zone where the individual platens of at least one of the endless platen belts move from a configuration in which each platen is angularly offset with respect to the following platen to an essentially coplanar configuration, each platen defining a leading projection coplanar with the body portion of said platen and projecting beyond the trailing end of the leading platen attached thereto, the body portion of each platen defining a recess for receiving the leading projection of the trailing platen attached thereto;



drive means for driving the two superposed endless platen belts along respective travel paths;

pressure rolls for pressing the platens of said at least one endless platen belt so as to compress the material passing through the inlet zone of said material pressing travel path; and

control means for controlling said pressure rolls so that variable pressure is exerted on said platens as said platens pass said pressure rolls, maximum pressure being exerted on the platens in the inlet zone only when said pressure rolls act on the portions of the platens between the projections and the recesses thereof.

3,992,135

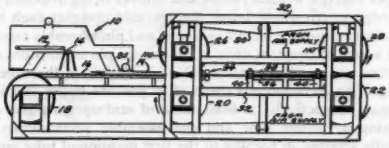
APPARATUS FOR CONTINUOUSLY MANUFACTURING BOARDS

Stafford V. Camp, III, Courtland, Va., assignor to Southampton Manufacturing Company, Incorporated, Richmond, Va.

Division of Ser. No. 593,199, July 7, 1975, Pat. No. 3,973,893, which is a continuation of Ser. No. 354,906, April 26, 1973, abandoned. This application Mar. 2, 1976, Ser. No. 663,111

Int. Cl.² B29C *15/00;* **B29J** *5/00*

U.S. Cl. 425—174.2 **4 Claims**



1. Apparatus for continuously manufacturing board from a mixture of board particles and a bonding agent, comprising:

means for forming a mat of said mixture; compressing means for sizing said mat; a pair of spaced platens;

a pair of endless belts which engage surfaces on opposite sides of the mat and which carry the mat from the mat forming means past the compressing means and between said platens;

means associated with said platens for distributing fluid under pressure against said belts thereby developing fluid bearings between said platens and the belts and causing said mat to be dimensioned to its final size; and

means for heating said mat dielectrically as it is carried between said platens to cure said bonding agent to form the board from said mat.

3,992,136

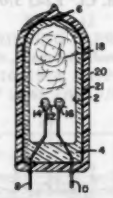
PHOTOFLASH LAMP WITH POLYCARBONATE COATING

John W. Shaffer, Williamsport, Pa., assignor to GTE Sylvania Incorporated, Montoursville, Pa.

Filed Nov. 1, 1974, Ser. No. 519,965

Int. Cl.² F21K *5/02*

U.S. Cl. 431—94 **15 Claims**



1. A photoflash lamp comprising an hermetically sealed glass envelope, a combustion-supporting gas in said envelope, a quantity of combustible material located in said envelope, ignition means attached to said envelope and disposed in operative relationship to said combustible material, a protective coating substantially comprising an acidified polycarbonate resin on the exterior surface of said glass envelope, and an alkali-barrier coating disposed between said polycarbonate coating and said glass envelope for extending the shelf-life of said polycarbonate coating under humid conditions by preventing alkali released by said glass envelope from reacting with said polycarbonate coating.

3,992,137

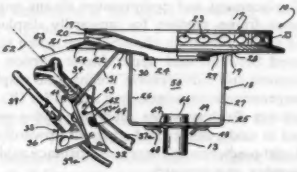
GAS BURNER

John A. Streisel, Bourbonnais, Ill., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Feb. 21, 1975, Ser. No. 551,711

Int. Cl.² F23Q *9/00*

U.S. Cl. 431—278 **6 Claims**



1. A gas burner assembly, comprising a tube operatively conducting gas, pilot means retaining a pilot burner operatively supplying a pilot flame along an axis, main burner means including a gas distributing head providing a gas inlet opening communicating with a gas outlet, mounting means connected to said distributing head and forming a unitary unit therewith and including a mounting portion spaced from said distributing head and defining an air-gas mixing area therebetween and a pair of spaced leg portions connecting said mounting portion to said distributing head with said air-gas mixing area located therebetween and communicating with said gas inlet opening, said unitary unit including an extending member retaining said pilot means and maintaining said pilot burner spaced adjacently to said gas outlet of said distributing head and spaced from said air-gas mixing area, said extending member comprising an extension of one of said legs, and means removably connecting said tube to said mounting portion to removably support said pilot and main burner means.

3,992,138
APPARATUS FOR COMBUSTION CHAMBER TREATMENT OF METAL ARTICLES

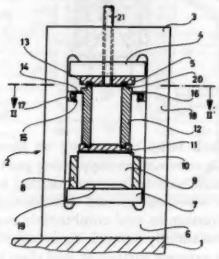
Ernst Leisner, Gerlingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Aug. 14, 1975, Ser. No. 604,490

Claims priority, application Germany, Aug. 21, 1974, 2440040

Int. Cl.² F24J *3/00*

U.S. Cl. 432—231 **4 Claims**



1. Apparatus for subjecting non-combustible articles to heat accompanied by a rapid local increase of pressure in a combustion chamber, comprising, in combination:

a substantially vertical frame (**2**) holding substantially horizontal upper (**3**) and lower (**6**) portions thereof in spaced relation to each other and capable of resisting pressure tending to force said portions vertically apart;

an upwardly open combustion chamber unit having a peripheral wall (**12**) and a bottom member (**11**) together capable of withstanding vertical compression;

vertical displacement and compression means mounted on said lower frame portion for upwardly displacing and pressing said combustion chamber unit when said unit is interposed between said upper frame portion and said displacement and compression means, said displacement and compression means including a cylinder (**8**) arranged to receive a fluid pressure medium, and a piston (**9**) arranged in said cylinder to be moved upwardly by pressure of said medium and thereby to displace said combustion chamber unit upward;

means (**16, 17**) for conveying said combustion chamber unit into and out of said frame so disposed as to enable said combustion chamber unit to be positioned between said upper frame portion and said vertical displacement and compression means, and

a top plate for said combustion chamber unit affixed to said upper frame portion and arranged to be sealed gas-tight to said combustion chamber unit when said combustion chamber unit is pressed upward against said top plate by said displacement and compression means, said top plate being provided with combustion gas inlet means for the combustion chamber formed by said combustion chamber unit and said top plate, said combustion chamber unit being further so constructed that pressure applied by said vertical displacement and compression means serves to deal said peripheral wall and bottom member of said combustion chamber unit into gas-tight condition and simultaneously to seal said peripheral wall to said top plate in gas-tight condition in each case sufficiently to withstand thereafter a rapid increase in pressure within said combustion chamber.

3,992,139
SUPPORT ASSEMBLY FOR SUPPORTING POTTERY ARTICLES

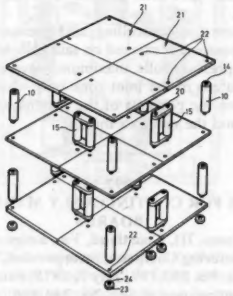
William John Lovatt, Stoke-on-Trent, England, assignor to Acme Marls Limited, Stoke-on-Trent, England

Filed Mar. 24, 1975, Ser. No. 561,374

Claims priority, application United Kingdom, Apr. 2, 1974, 14556/74

Int. Cl.² F27D *5/00*

U.S. Cl. 432—258 **4 Claims**



1. A support assembly for supporting pottery articles during treatment in a kiln, comprising a plurality of uprights, a plurality of shelves each having a plurality of through holes, at least two of said shelves being disposed edge to edge to constitute upper shelves, at least two of said shelves being disposed edge to edge to constitute lower shelves, said uprights each being a unitary structure including a tube and pin assembly comprising a tube of constant cross section and a pin of constant cross section permanently and rigidly secured within the tube and projecting at both ends there of to provide upper and lower spigots respectively, at least some of said uprights also comprising a further tube and pin assembly permanently and rigidly secured in parallel to the first mentioned tube and pin assembly whereby such uprights afford two upper spigots and two lower spigots, the upper spigots being engaged in through holes of a pair of adjacent upper shelves and the lower spigots being engaged in through holes of a pair of adjacent lower shelves.

3,992,140

PRINTING INKS FOR TRANSFER PRINTING

Hubertus Psaar, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 10, 1974, Ser. No. 468,673

Claims priority, application Germany, May 18, 1973, 2325154

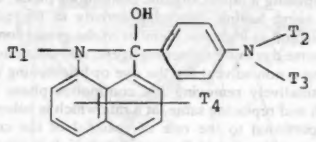
Int. Cl.² D06P *1/645*

U.S. Cl. 8—2.5 A 3 Claims

1. Printing inks for the preparation of auxiliary carriers for transfer printing on acid-modified textile fiber materials comprising

1. a sublimable dyestuff intermediate,
2. a practically anhydrous neutral organic solvent, and
3. a neutral resin soluble in said solvent;

the improvement which comprises employing as the sublimable dyestuff intermediate a carbinol base which sublimes at 160°–240° C and has the formula:



wherein

T_1 denotes methyl, ethyl, n-propyl, n-butyl, or cyanoethyl;
T_2 denotes methyl or ethyl;
T_3 denotes H, methyl, or ethyl; and
T_4 denotes H, Br, or Cl.

3,992,141

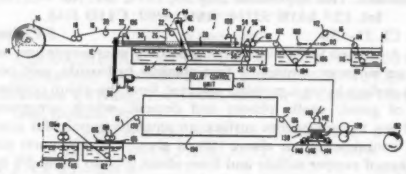
METHOD OF AND APPARATUS FOR TREATING PLASTIC FILM

Sidney J. Baum, Encino, and Anton J. Mayr, Canoga Park, both of Calif., assignors to Foster Grant Co., Inc., Leominster, Mass.

Filed Nov. 21, 1972, Ser. No. 308,633

Int. Cl.² B05C *11/04*

U.S. Cl. 8—4 10 Claims



1. A method for processing uniaxially stretch-oriented polyvinyl alcohol film to produce optically uniform polarizing sheets in which the film is submerged in a bath of dichroic dye solution to which it is substantially impervious and which dye solution has a tendency to adhere to the surface of said polyvinyl alcohol film in droplets, comprising the steps of drawing a running length of the film longitudinally through the dye bath, withdrawing the film in an upward directin from the bath, removing adhering droplets of bath liquid from the surface of the film as it is withdrawn from the bath by immediately passing the film between a first pair of squeeze rolls which are positioned closely adjacent the top surface of the bath liquid, immediately rinsing at least one surface of the film as it emerges from the nip of said rolls to remove any adhering bath liquid from said at least one surface as the film emerges from between said rolls by flowing a rinsing liquid into the exit nip of said rolls between said at least one surface and the adjacent roll before any dye adhering to said film after passing through said rolls can form into droplets whereby film spotting is avoided and an optically uniform polarizing sheet is produced, and permitting said rinsing liquid to flow axially along and be discharged from said nip at the end of said rolls.

3,992,142

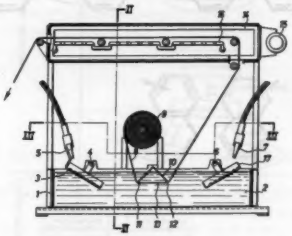
PRINTING FABRIC

Luis Farre, 3, Irineo St., Tarrasa, Barcelona, Spain

Filed Oct. 16, 1974, Ser. No. 515,385

Int. Cl.² D06P *1/90, 3/87, 7/00*

U.S. Cl. 8—16 1 Claim



1. In a process for the continuous printing on fabrics in which a surface layer of dyes is distributed on the surface of a liquid in a vat; the dyes are transferred directly onto a continuous strip of fabric which is partially submerged in said vat whereby the fabric picks up a dye coating directly; and thereafter the fabric is continuously dried by hot air and radiation, wherein the dyes on the surface of the liquid are distributed thereupon by the steps of firstly blowing air thereon through a nozzle in an adjustably tilted trough structure across the entire liquid width, partially submerging the structure in the liquid; and tilting said trough, wherein a fabric strip to be printed is immersed in the liquid containing a surface film of dyes and is guided therein by a baffle plate system to provide a level run of the fabric.

3,992,143

EXHAUST PROCESS FOR THE DYEING OF SYNTHETIC FIBER MATERIALS

Richard Sommer, Leverkusen, and Wolfgang Haebler, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 237,519, March 23, 1972, abandoned. This application June 20, 1974, Ser. No. 481,223

Claims priority, application Germany, Mar. 23, 1971, 2113836

Int. Cl.² D06P *1/02, 3/12*

U.S. Cl. 8—41 R 11 Claims

1. Process for dyeing synthetic fiber material comprising the steps of

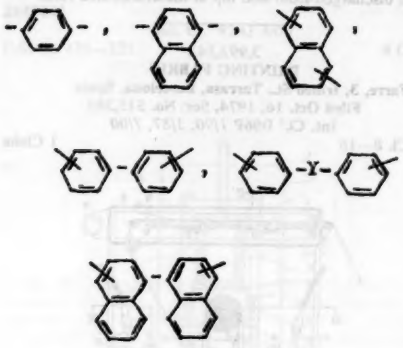
1. immersing the synthetic fiber material in a dyebath consisting essentially of
   a. water-immiscible organic solvent having a boiling point of 40° C–170° C and up to 1% by weight of water based on said solvent; and
   b. a dis- or triazo dyestuff containing at least two hydroxyl groups but free from sulphonic acid and carboxyl groups having the formula

A–N=N–B–N=N–D

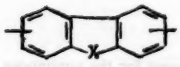
in which

A and D each is the radical of a coupling component of the phenol or naphthol series;

B is an unsubstituted or substituted radical selected from the group consisting of

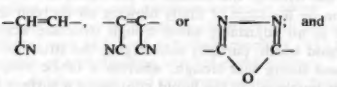


and



;

Y is —O—, —S—, —NH—, —SO_2—, —CONH—, —NHCONH—, —CH_2—, —CH_2—CH_2—, —CH=CH—, —N=N—,



X is —SO_2—, —NH—, —N—C_1-C_4-alkyl, —CH_2— or —N=N—; and then

2. dyeing at a temperature of 60 to 170° C until the dyestuff is exhausted from the dyebath.

3,992,144

MIGRATION-FREE TEXTILE DRYING

Harold L. Jackson, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,561

Int. Cl.² D06P *1/68*

U.S. Cl. 8—174 **19 Claims**

1. Textile drying process comprising continuously contacting a moving textile web, which is wet with a first fluorocarbon liquid having a textile agent dispersed therein, said agent being a dye, a bacteriostatic agent, an ultraviolet light screening agent, a fluorescent brightening agent, a fire retardant agent, an antistatic agent, a pigment, a water repellent, a fungicide, a soil release agent or a permanent-press agent, with the superheated vapors of a second fluorocarbon liquid, the superheated vapors being at a temperature such that no substantial amount of second fluorocarbon liquid condenses on the web, to evaporate substantially all of the first fluorocarbon liquid from the web in no more than seven seconds without causing substantial migration of the textile agent on the web, said first and second fluorocarbon liquids being the same or different and selected from fluoro and chlorofluoro substituted aliphatic and cycloaliphatic hydrocarbons, ethers and tertamines wherein the ratio of hydrogen atoms to halogen atoms is 0–0.2, the first fluorocarbon liquid having a boiling point of 20°–110° C. and the second fluorocarbon liquid having a boiling point of 20°–220° C.

3,992,145

RAPID APPLICATION AND FIXATION OF DYE OR BRIGHTENING AGENT ON SYNTHETIC POLYMER

George R. Coraor, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,567

Int. Cl.² D06P *1/68*

U.S. Cl. 8—174 **13 Claims**

1. Non-aqueous, atmospheric pressure, batch exhaust process for applying and fixing a disperse dye or brightening agent on a disperse dyeable synthetic polymer, said process comprising:

a. immersing the polymer in a bath containing a dispersion comprising a liquid, organic continuous phase, a dispersing agent having dispersing activity in the continuous phase and at least one member of the group consisting of disperse dye and brightening agent, said continuous phase being a non-solvent for the dye or brightening agent;

b. distillatively removing the continuous phase from the bath and replacing same, at a rate which is volumetrically proportional to the rate of removal of the continuous phase, with a liquid fluorocarbon which is miscible with the continuous phase and has a fluorine to carbon atom ratio of at least 1.5, a solubility parameter of no greater than 6.5 and a boiling point at 760 mm. pressure at least as high as the glass transition temperature of the polymer and at least 10° C. higher than that of the continuous phase;

c. heating the polymer, in the presence of the liquid fluorocarbon, to at least its glass transition temperature and maintaining it at this temperature until the dye or agent is fixed on the polymer; and

d. recovering polymer having dye or agent fixed thereon.

3,992,146

PROCESS OF USING BIOCIDAL SOLUTIONS CONTAINING COPPER SULFATE

Frank A. Fazzalari, Box 1746, Poughkeepsie, N.Y. 12601

Continuation-in-part of Ser. No. 180,065, Sept. 13, 1971, abandoned. This application July 30, 1974, Ser. No. 493,180

Int. Cl.² A61K *33/34*; A61L *9/00*; C11D *3/48*

U.S. Cl. 21—58 **6 Claims**

1. A process for inhibiting the growth of microorganisms on porous surfaces containing free alkaline hydroxide, said porous surface being a member selected from the group consisting of grout, caulk, plaster and cement, which comprises applying to said porous surface an aqueous germicidal solution containing from about 100 to about 100,000 parts per million of copper sulfate and from about 0.05 to about 6% by weight of a water soluble anionic nitrogen-containing surfactant, whereby a water insoluble tribasic cupric sulfate complex forms on said porous surface.

3,992,147

PROCESS FOR STERILIZING PSYLLIUM SEED HUSK USING AQUEOUS ISOPROPANOL

John W. Christian, Phoenix, Ariz., and Jerry J. Renbarger, Park Ridge, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 516,603, Oct. 21, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 631,979

Int. Cl.² A61L *13/00*; A23B *9/00*

U.S. Cl. 21—58 **2 Claims**

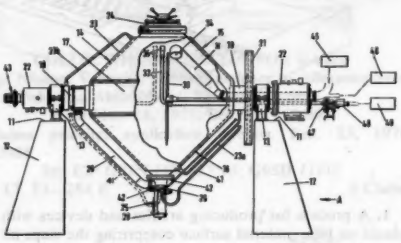
1. A method for sterilizing psyllium seed husk without substantial swelling of the psyllium seed husk comprising contacting for 5 minutes or more said psyllium seed husk with a 15°–50° C solution of 0.2–10% by weight hydrogen peroxide

in a solvent having 2–50 parts by volume water and 50–98 parts by volume isopropanol.

3,992,148
HEAT TREATMENT OF PARTICULATE SOLID MATERIAL

David Teignmouth Shore, Banstead, and Hugh Eddowes, Haywards Heath, both of England, assignors to The A.P.V. Company Limited, Crawley, England

Filed Feb. 20, 1975, Ser. No. 551,319
Claims priority, application United Kingdom, Feb. 26, 1974, 8709/74
Int. Cl.² A61L *3/00*; **B01F** *9/02, 15/02*; **A23B** *4/00*
U.S. Cl. 21—94 **10 Claims**



1. In apparatus for preparing sterilized particulate solid material, comprising a sterilized vessel mounted on a pair of hollow trunnions for rotation about a generally horizontal axis and shaped so as to provide a tumbling action on particulate solid material therein as it rotates, a fluid inlet leading via one of said hollow trunnions, a source of cleaning and sterilizing fluids: the improvement that the vessel includes a discharge valve connected to the vessel at a point remote from the axis of rotation leading into a solids discharge duct passing out of the vessel via one of the hollow trunnions, and a supply line connected to said source and in fluid flow communication with the discharge valve, said supply line passing via one of said hollow trunnions for conveying cleaning and sterilizing fluids to the discharge duct, whereby the discharge duct may be cleaned and sterilized in preparation for discharge while the vessel is rotating.

3,992,149
COLORIMETRIC METHOD FOR THE ANALYSIS OF RESIDUAL ANIONIC OR CATIONIC SURFACTANTS

Lawrence K. Wang, Troy, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,692
Int. Cl.² G01N *31/00, 31/22, 33/18, 31/16*
U.S. Cl. 23—230 R **8 Claims**

1. A method for the analysis of residual anionic and cationic surfactants present in an aqueous solution including the steps of:

obtaining a known volume first sample of the aqueous solution to be tested;

adding buffer solution, a first dye reagent and chloroform to the first sample and mixing thoroughly to permit the formation of a water-chloroform two-phase mixture;

allowing the first sample to stand undisturbed to permit the separation of chloroform from the two-phase mixture, the separated chloroform layer being colored in the presence of residual anionic surfactants in the first sample;

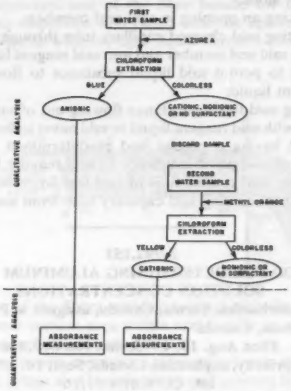
if the separated chloroform layer is colored, colorimetrically determining the concentration of the residual anionic surfactants which are directly related to the intensity of the color of the chloroform layer; and

if the chloroform layer of the two-phase mixture of the first sample is not colored the first sample contains no residual anionic surfactants and the following further steps are carried out:

a. obtaining a known volume second sample of the aqueous solution to be tested;

b. adding buffer solution, a second dye reagent and chloroform to the second sample and mixing thoroughly to permit the formation of a water-chloroform two-phase mixture;

c. allowing the second sample to stand undisturbed to permit the separation of chloroform from the two-phase mixture, the separated chloroform layer of the second sample being colored in the presence of residual cationic surfactants in the second sample; and

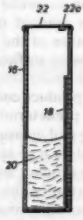


d. if the separated chloroform layer of the second sample is colored, colorimetrically determining the concentration of the residual cationic surfactants which are directly related to the intensity of the color of the chloroform layer of the second sample, if the chloroform layer of two-phase mixture of the second sample is not colored the second sample contains no residual ionic surfactants.

3,992,150
METHOD AND EQUIPMENT FOR SPEEDY PREPARATION OF TEST LIQUIDS

Erich Retzer, Maisach, Germany, assignor to Compur-Werk Gesellschaft mit beschrankter Haftung & Co., Munich, Germany

Filed Apr. 28, 1975, Ser. No. 572,222
Claims priority, application Germany, May 8, 1974, 2422260
Int. Cl.² A61B *10/00*; **B01L** *3/02*; **G01N** *1/10, 33/16*
U.S. Cl. 23—230 R **10 Claims**



1. A method of preparing a test liquid for analysis of a liquid substance, said method using said liquid substance, a reagent liquid, a cuvet having predetermined transparent characteris-

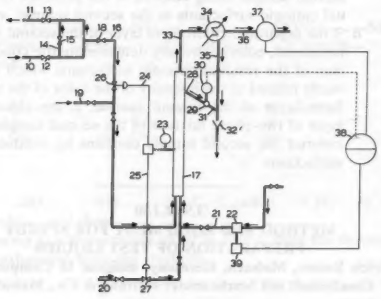
tics suitable for optical measuring of said test liquid in said cuvet, and a capillary tube sized for taking up a predetermined, full charge volume of said liquid substance by capillary action, said method comprising the steps of:

a. placing a predetermined volume of said reagent liquid in said cuvet;
b. placing a seal member over the opening to said cuvet;
c. inserting an end of said capillary tube in said liquid substance to fully charge said capillary tube with said predetermined volume of said liquid substance by capillary action alone;
d. breaking an opening in said seal member;
e. thrusting said charged capillary tube through said opening in said seal member and into said reagent liquid in said cuvet to permit said liquid substance to flow into said reagent liquid;
f. mixing said liquid substance flowing out of said capillary tube with said reagent liquid in said cuvet to form said test liquid having a precise and predetermined volumetric ratio of said liquid substance to said reagent liquid; and
g. making said test analysis of said test liquid in said cuvet without removing said capillary tube from said cuvet.

3,992,151
METHOD FOR DETERMINING ALUMINUM HALIDE SOLUTION CONCENTRATIONS

Hans Vanderhoeden, Sarnia, Canada, assignor to Polysar Limited, Sarnia, Canada

Filed Aug. 19, 1975, Ser. No. 605,846
Claims priority, application Canada, Sept. 10, 1974, 209008
Int. Cl.² G01N *31/16*
U.S. Cl. 23—230 R **7 Claims**



1. A process for determining the concentration of an aluminum halide in a solution of the aluminum halide in a volatile solvent, which comprises in combination the steps of:

bringing the solution continuously into contact with hot water or steam to form an acidic reaction product which is proportional to the amount of aluminum halide, the quantity and temperature of the hot water or steam and the time of contact being sufficient to volatilize the solvent;

contacting the reaction product continuously with an aqueous alkali solution of predetermined concentration;

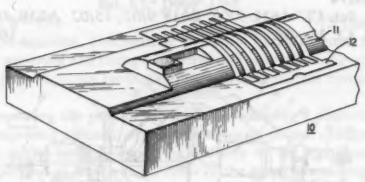
continuously controlling and measuring the rate of supply of said aqueous alkali solution so as substantially to neutralize the acidic reaction product and maintain the pH of the resultant reaction mixture within the pH range of 6.5 to 7.5 and thereby measure the amount of said acidic reaction product;

and measuring the quantity of solvent volatilized, the concentration of the aluminum halide in the solvent being determined from the rate of supply of said aqueous alkali solution and the quantity of solvent volatilized.

3,992,152
GOLD PLATING TEST PROCEDURE

Yutaka Okinaka, Madison, and Miles Vincent Sullivan, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 3, 1976, Ser. No. 682,323
Int. Cl.² G01N *33/20*
U.S. Cl. 23—230 C **11 Claims**



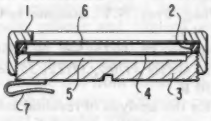
1. A process for producing articles and devices with gold plated on base material surface comprising the steps of:

a. plating the base material surface with gold to form a gold plated surface and
b. testing the gold plated surface for exposed base material characterized in that the testing procedure comprises the steps of first insuring that defects with exposed base material contain substance with greater catalyzing activity toward peroxide decomposition than gold and then exposing said gold plated surface to an aqueous peroxide solution.

3,992,153
DOSIMETER FOR OXIDES OF NITROGEN

Benjamin I. Ferber; Fredrick A. Sharp, and Robert W. Freedman, all of Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed May 20, 1976, Ser. No. 688,515
Int. Cl.² B01D *13/00*; G01N *31/06*
U.S. Cl. 23—232 R **28 Claims**



11. A method for the determination of exposure to nitrogen dioxide gas in an atmosphere comprising the steps of:

a. exposing to an atmosphere, a dosimeter comprising a container, open to the atmosphere by means of a membrane which is substantially permeable only to gases, having therein an aqueous solution which converts NO_2 to NO_3^- ion;
b. determining the concentration of NO_3^- ion in solution; and
c. determining the concentration of NO_2 in said atmosphere by correlation of said concentration of NO_3^- with other concentrations of NO_3^- ions found when said dosimeter was exposed to known concentrations of NO_2 gas.

3,992,154
ETHYLENE OXIDE STERILIZATION INDICATOR

James E. Whitbourne, and Carolyn A. Eastman, both of Rochester, N.Y., assignors to Sybron Corporation, Rochester, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,189
Int. Cl.² G01N 31/22
U.S. Cl. 23—253 TP 14 Claims

1. A method of monitoring a sterilization and aeration process employing ethylene oxide as sterilant in presence of controlled humid atmosphere and temperature comprising:

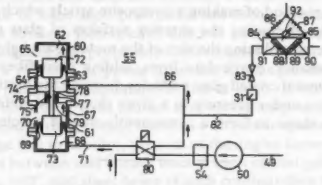
a. exposing goods and an indicator to the sterilant till the indicator undergoes a color change;

b. placing the goods and said indicator in an aeration chamber till the indicator undergoes another color change.

3,992,155
COLLECTING APPARATUS FOR GASES

Bengt Nilsson, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Mar. 24, 1976, Ser. No. 669,803
Claims priority, application Sweden, Feb. 23, 1976, 7602085
Int. Cl.² G01N 1/26, 27/16; G05D 11/03
U.S. Cl. 23—254 E 5 Claims



1. An apparatus for collecting a combustible gas under pressure and determining the amount of combustible constituents therein,

comprising a first chamber forming a first space having a movable first variable displacement means, a second chamber forming a second space having a movable second variable displacement means, means for interconnecting said displacement means so that by movement thereof they vary the displacements of said chambers with a fixed ratio of displacement therebetween, said displacements means being biased to move in directions reducing the volumes of said spaces, feeding means for feeding said combustible gas to said first space to move the first displacement means against the bias while thereby moving the second displacement means to increase the volume of said second space and for feeding an oxidizing gas to said second space, discharge means for thereafter closing said chambers to said feeding and interconnecting the chambers to a common discharge conduit so that the two displacement means via their bias displace the combustible gas and oxidizing gas together to said conduit.

3,992,156
MASS TRANSFER APPARATUS

Kenyon E. Clonts, Houston, Tex., assignor to Merichem Company, Houston, Tex.

Filed July 23, 1975, Ser. No. 598,274
Int. Cl.² B01D 11/04; B01F 3/04, 3/08; C10G 17/00
U.S. Cl. 23—267 MS 21 Claims

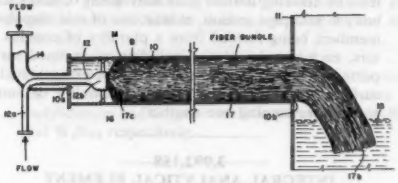
1. In an apparatus for effecting contact between a liquid and a fluid immiscible with said liquid in order to enable mass transfer theretween, comprising:

a conduit having an inlet and an outlet, said conduit inlet being adapted to receive said fluid and said conduit outlet being adapted for placement with a collection vessel;

a fiber bundle positioned longitudinally within said conduit, said fiber bundle containing a plurality of generally linearly extending fibers having a downstream end extending outwardly of the end of said conduit outlet for making connection with a layer of said liquid in said collection vessel and an upstream end positioned within said conduit;

bundle mount means securing the upstream portion of said fiber bundle within said conduit;

and liquid distribution means positioned sufficiently close to said upstream end of the fiber bundle for transferring without dispersion said liquid onto the upstream end of said bundle whereby said liquid forms a film over the surface of the fibers enabling contact with the fluid over sufficient surface area within said bundle to provide for mass transfer therebetween;

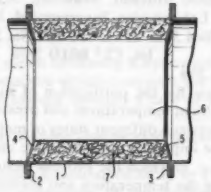


the improvement comprising stress alleviation means positioned within and linearly along said conduit in operative engagement with said fiber bundle for alleviating at least some of the stress exerted on the fibers in said fiber bundle, said stress alleviation means including at least one elongated support member extending generally along and within said fiber bundle, said elongated support member including fiber support means for engaging at least some of said fibers within said fiber bundle and at least partly transferring stress from said fibers to said bundle mount member.

3,992,157
EXHAUST GAS CATALYST MOUNTING

Manfred Stute, Esslingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Apr. 10, 1974, Ser. No. 459,797
Claims priority, application Germany, Apr. 11, 1973, 2318126
Int. Cl.² B01J 8/02, 35/04; F01N 3/15
U.S. Cl. 23—288 FC 3 Claims



1. A catalytic converter for treating exhaust gas comprising:

an exhaust gas catalyst body having an inlet face and an outlet face arranged perpendicular to the flow direction of exhaust gas through said catalyst body,

a pipe section containing said catalyst body, the ends of said pipe section respectively forming an exhaust gas inlet and an exhaust gas outlet, said catalyst body being spaced away from the inner wall of said pipe section so that said pipe section and said catalyst body define therebetween an annular space,

a heat-resistant insulating material substantially filling said annular space thereby radially elastically supporting said catalyst body in said pipe section, and

two prestressed ring-shaped members arranged laterally at the inlet face and the outlet face of said catalyst body, each prestressed ring-shaped member including a flat annular inner flange arranged perpendicular to said flow direction, the flat annular inner flange of one ring-shaped member engaging said inlet face and the flat annular inner flange of the other ring-shaped member engaging said outlet face, each ring-shaped member further including an inclined surface portion integral with the respective flat inner annular flange and mounted on said pipe section such that said two prestressed ring-shaped members elastically clamp said catalyst body therebetween thereby allowing limited axial movement of said catalyst body in said pipe section, at least one of said ring-shaped members being formed from a plurality of annulus sectors, each annulus sector including an inclined surface portion, an inner flange portion integral with said inclined surface portion and wherein said plurality of annulus sectors overlapping one another.

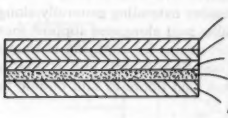
3,992,158
INTEGRAL ANALYTICAL ELEMENT

Edwin P. Przybylowicz, and Allan G. Millikan, both of Webster, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. Nos. 388,868, Aug. 16, 1973, abandoned, and Ser. No. 267,849, June 30, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,072

Int. Cl.² G01N *21/24, 33/16*

U.S. Cl. 23—253 TP **55 Claims**



1. An integral element for analysis of liquids, said element comprising, in fluid contact, an isotropically porous spreading layer comprising a non-fibrous material, and a reagent layer permeable to a substance spreadable within the spreading layer or a reaction product of such a substance.

3,992,159
PROCESS FOR PURIFICATION BY CRYOGENIC SUBLIMATION

James Windfield Mitchell, Somerset, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 23, 1975, Ser. No. 589,204

Int. Cl.² B01D *7/00*

U.S. Cl. 23—294 **15 Claims**

1. A process for the purification of substances which are liquids at ambient temperatures and pressures by phase transformations between different states of matter of the substance so as to leave impurities in the residue and collecting a purified substance, in which the process includes the steps of

a. reducing the temperature and pressure of the substance being purified from ambient temperatures and pressure to below the triple point of the substance being purified using cooling means and pressure reducing means,

b. carrying out the phase transformation between states of matter of the substance being purified from solid state to vapor state,

c. collecting the purified substance in a collection vessel, and

d. increasing the temperature and pressure of the purified substance to ambient temperatures and pressures so as to return the purified substance to the liquid state.

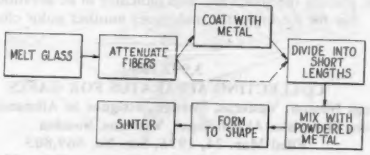
3,992,160
COMBINATIONS OF PARTICULATE METAL AND PARTICULATE GLASS

Alfred Marzocchi, and David E. Leary, both of Cumberland, R.I., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed June 27, 1974, Ser. No. 483,584

Int. Cl.² B22F *3/00, 1/04*

U.S. Cl. 29—182.5 **7 Claims**



1. The method of making a composite article which consists essentially of coating the exterior surfaces of glass particles with a metal, reducing the size of the metal coated glass particles to smaller, particulate form, adding glass fibers to the reduced metal coated glass particles, forming the particles and glass fibers under pressure to a given shape, and sintering the resulting shape to form a permanently-shaped article.

3,992,161
IRON-CHROMIUM-ALUMINUM ALLOYS WITH IMPROVED HIGH TEMPERATURE PROPERTIES

Robert Lacock Cairns, and John Stanwood Benjamin, both of Suffern, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Division of Ser. No. 325,313, Jan. 22, 1973, Pat. No. 3,837,930, which is a continuation-in-part of Ser. No. 218,404, Jan. 17, 1972, abandoned. This application Apr. 3, 1974, Ser. No. 457,436

Int. Cl.² B22F *3/00*

U.S. Cl. 29—182.5 **13 Claims**

1. A powder metallurgy product consisting essentially of by weight, at least one element from the group consisting of about 10% to about 40% chromium and about 1% to about 10% aluminum, and up to about 10% nickel, up to about 20% cobalt, up to about 5% titanium, up to about 2% each of rare earth metal, yttrium, zirconium, columbium, hafnium, tantalum, silicon, and/or vanadium, up to about 6% each of tungsten and molybdenum, up to about 0.4% carbon, up to 0.4% manganese, and the balance iron, and further, including, by volume, about 0.1% to about 10% refractory dispersoid material selected from the group consisting of refractory metal oxide, metal carbide, metal nitride, metal boride, and combinations thereof, and having an average particle size of about 50A to 5000A and a melting point of at least about 2750° F., said dispersoid material being in the form of particles distributed substantially uniformly throughout said product; said product having a density of at least about 98 % theoretical and being characterized by elongated grains about 10 to 100 microns wide and about 50 to 2000 microns long, and said grains being substantially stable at temperatures up to at least about 2400° F., said product being formed by consolidation of a mixture containing dispersoid particles or precursors thereof uniformly distributed through such mixture, and said product exhibiting substantially no loss in room temperature ductility upon exposure to 2400° F for at least about 100 hours.

3,992,162
SHEET WITH ALTERNATE PROTRUSIONS AND RECESSES

Lucien Victor Gewiss, Vernon, France, assignor to Marc Wood International, Inc., New York, N.Y.

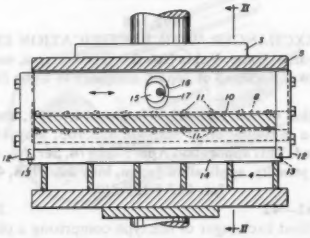
Division of Ser. No. 514,171, June 9, 1955, Pat. No. 3,698,879. This application Mar. 17, 1971, Ser. No. 125,230
The portion of the term of this patent subsequent to Oct. 17, 1989, has been disclaimed.
Int. Cl.² B32B *15/00*
U.S. Cl. 29—193.5 16 Claims

1. A sheet of material having a succession of alternate protrusions and recesses with spaces between successive protrusions on the one hand and successive recesses on the other, the walls of each such protrusion and recess containing elementary surfaces joining each other in an undulatory manner at the ridges of said protrusions and recesses along a single line having a plurality of points at which it changes direction to form a plurality of undulations and at each of which points border lines of at least four of said elementary surfaces converge, said surfaces being ruled in a direction extending from one ridge line to another, the sum of the angles formed on said surfaces between said border lines at each of said points being equal to 360°, said sheet being of such configuration that it (1) is completely developable on the plane to which it is expanded and (2) cannot be completely contracted so that each of its ruled elementary surfaces is in complete surface area contact with its next adjacent ruled elementary surface.

3,992,163
ALUMINUM-CONTAINING WELDED GRATING

Harold Nagin, Pittsburgh, Pa., assignor to Reliance Steel Products Company, McKeesport, Pa.

Division of Ser. No. 583,270, Sept. 30, 1969, Pat. No. 3,469,300, and a continuation-in-part of Ser. No. 832,150, June 11, 1969, abandoned. This application Feb. 10, 1971, Ser. No. 114,327
Int. Cl.² B32B *15/20*
U.S. Cl. 29—191.6 5 Claims



1. A new article of manufacture comprising a grating having longitudinally extending spaced metal bearing bars and spaced metal cross bars welded to the bearing bars at intervals therealong by fusion welding, wherein the welds are friction welds formed by reciprocating under pressure one of said bars against the other, at least one set of said bearing and cross bars being formed of aluminum.

3,992,164
HIGH-WEAR RESISTANT COMPOSITE SEAL

Werner H. Fengler, 23651 Fordson Drive, Dearborn, Mich. 48124

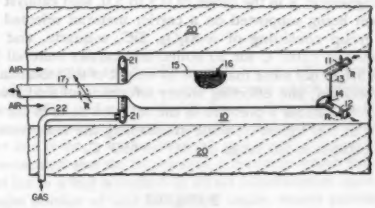
Division of Ser. No. 506,332, Sept. 16, 1974. This application Aug. 13, 1975, Ser. No. 604,336
Int. Cl.² B32B *15/18*, *15/20*
U.S. Cl. 29—196 5 Claims

1. A composite wear-resisting element for a component of a machine, comprising
a base portion composed of a metallic material selected from the group consisting of aluminum and iron and subject to excessive wear during operation of the machine, and
a wear-resistant coating on said base portion,
said coating consisting of an alloy composed of ruthenium and a material selected from the group consisting of molybdenum and tungsten in the compositions Mo_5Ru_3 and W_5Ru_2 respectively.

3,992,165
FUEL REFORMATION SYSTEM

Marc S. Newkirk, Harvard, Mass., assignor to International Materials Corporation, Burlington, Mass.

Continuation-in-part of Ser. No. 438,697, Feb. 1, 1974, abandoned, which is a continuation of Ser. No. 328,886, Feb. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 202,938, Nov. 29, 1971, abandoned. This application June 19, 1975, Ser. No. 588,306
Int. Cl.² C10G *9/48*
U.S. Cl. 48—214 R 16 Claims



1. A method of steam reforming a hydrocarbon feedstock including coke precursors which comprises the steps of
A. flowing the feedstock through a tube of a noncatalytic reactor,
B. simultaneously flowing superheated steam through said tube,
C. heating the reactor tube sufficiently to effect substantially complete conversion of the feedstock into fixed gaseous products and coke,
D. maintaining reactor tube temperature sufficient to simultaneously effect oxidation of said coke by the superheated steam,
E. continuously controlling the steam-to-carbon molar ratio of the feedstock and steam reactants in the reactor tube to maintain a balance between the rate of coke laydown on the interior surfaces of the reactor tube and the rate of coke removal therefrom so that a substantially constant coke inventory remains in the reactor tube.

3,992,166
LOW TEMPERATURE STEAM REFORMING PROCESS FOR HYDROCARBONS

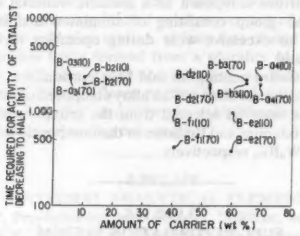
Akio Okagami, Fuchu; Akio Furuta, and Toshikazu Nakamura, both of Yokohama, all of Japan, assignors to Japan Gasoline Co., Ltd. and Nikki Chemical Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 424,843, Dec. 14, 1973, abandoned. This application June 19, 1975, Ser. No. 588,309

Claims priority, application Japan, Dec. 28, 1972, 48-001947

Int. Cl.[2] C10G *11/28*; C01B *2/16*

U.S. Cl. 48—214 A **9 Claims**



1. In a process for manufacturing a methane-containing gas by subjecting steam-reformable feed hydrocarbon to adiabatic low-temperature steam reforming in the presence of a nickel catalyst, the improvement which comprises preheating a mixture of said feed hydrocarbon with steam mixed in the ratio of moles of steam to the number of moles of carbon atoms in said feed hydrocarbon in the range of 0.9 to 5.0 to a temperature in the range of 250° to 600° C, feeding the preheated mixture into a steam reforming reaction zone containing a catalyst composition consisting of a binary catalyst component of Ni-MgO or Ni-NiO-MgO in which the atomic ratio of nickel to magnesium is in the range of 0.5 to 5.0, said catalyst component being supported on a carrier material selected from the group consisting of α-Al_2O_3, SiC, α-quartz, and ZrO_2 calcined at 1500° C for 20 hours, said carrier material being from 5.1 to not more than 70% by weight of said total catalyst composition, and effecting steam reforming of said feed hydrocarbon under a pressure in the reaction zone in the range of 10 to 100 kg/cm^{2}G, while maintaining the temperature of said catalyst in the range of 300° to 600° C.

3,992,167
LOW TEMPERATURE REFRIGERATION PROCESS FOR HELIUM OR HYDROGEN MIXTURES USING MIXED REFRIGERANT

Robert Arthur Beddome, North Tonawanda, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Apr. 2, 1975, Ser. No. 564,435

Int. Cl.[2] F25J *3/00*

U.S. Cl. 62—18 **14 Claims**

1. A low temperature refrigeration process, comprising the steps of:

a. providing a feed gas mixture at superatmospheric pressure comprising a major component selected from the group consisting of hydrogen and helium, and at least 5% by volume of a minor component having a normal boiling point of at least 170° K and a molecular weight of at least 28;

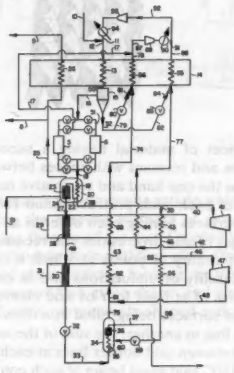
b. cooling the feed gas mixture to a temperature of between 80° and 140° K and above the freezing point of the minor component for liquefaction of said minor component, and separating the liquefied minor component from the cooled feed gas mixture to produce cooled minor component-depleted feed gas;

c. contacting said cooled minor component-depleted feed gas with an adsorption zone at the low temperature of step (b) for selective removal of the residual minor component therein and discharging pure major component from said zone;

d. further cooling at least part of said pure major component to a temperature at about its boiling point;

e. expanding a portion of said pure major component to lower pressure with the production of external work and cooling thereof to lower temperature above its boiling point;

f. partially rewarming lower pressure pure major component comprised at least in part of said work expanded portion of said pure major component by heat exchange with the pure major component as at least part of said further cooling of step (d);



g. throttling the separated liquefied minor component of step (b) to the lower pressure of the partially rewarmed pure major component, of step (f) and joining the throttled liquefied minor component with the partially rewarmed pure major component to form a recycle gas mixture;

h. further rewarming said recycle gas mixture to vaporize the liquefied minor component therein by heat exchange with the feed gas mixture as at least part of said cooling of step (b); and

i. dynamically compressing the further rewarmed recycle gas mixture and providing same as at least the major fraction of said superatmospheric pressure feed gas mixture of step (a).

3,992,168
HEAT EXCHANGER WITH RECTIFICATION EFFECT

Akira Toyama, Kobe; Yukio Nakako, Nishinomiya, and Toshio Kanazawa, Kobe, all of Japan, assignors to Kobe Steel Ltd., Japan

Continuation of Ser. No. 189,248, Oct. 14, 1971, abandoned, which is a continuation of Ser. No. 825,905, May 19, 1969, abandoned. This application Apr. 17, 1974, Ser. No. 461,510

Claims priority, application Japan, May 20, 1968, 43-34165

Int. Cl.[2] F25J *3/02*

U.S. Cl. 62—42 **20 Claims**

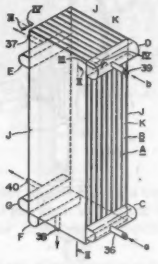
1. In a heat exchanger of the type comprising a plurality of combinations each of which includes

a first heat transfer element and a second heat transfer element, said first element for carrying a first fluid of higher temperature and said second element for carrying a fluid of lower temperature,

said elements being joined alternately and adjacently to each other,

a plurality of fins in said elements wherein indirect heat exchange is performed between said first fluid and said second fluid whereby at least said first fluid is changed in phase, the improvement which comprises:

a plurality of heat transfer regions in said first element located one above the other, the lowest of said regions containing a plurality of inclined and perforated fins therein, a first part for admitting said first element located in said lowest regions adjacent said inclined fins to permit said first fluid to enter said first element and travel up said first element to allow liquid to condense said first fluid upon heat exchange between said first and second fluids,



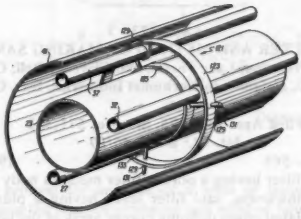
said condensed liquid being subjected to the inflow of additional amounts of said first fluid, said condensed liquid being removed through said perforations while said first fluid flows along said inclined and perforated fins and into said first element, at least one second fin having a flat surface, said first fin being disposed horizontally adjacent to said first port and in fluid communication with said inclined fins, and a second port disposed on said first element and below said lowest region, and a plurality of additional fins in said first element in said lowest region for providing a longitudinal passage below said inclined and perforated fins and said second fins and above said second port for removal of condensate.

3,992,169

REFRIGERATED CRYOGENIC ENVELOPE

John D. Loudon, Boulder, Colo., assignor to Cryogenic Technology, Inc., Denver, Colo.

Filed Apr. 18, 1975, Ser. No. 569,491
Int. Cl.² F17C 7/02
U.S. Cl. 62—55 **8 Claims**



1. An elongated cryogenic envelope comprising:

an inner tube;

an outer tube generally coaxial with said inner tube;

means for supporting said inner tube within said outer tube, at least a portion of the volume between said inner tube and said outer tube providing a vacuum chamber for holding a vacuum;

refrigeration means for directing refrigeration into said vacuum chamber at a temperature intermediate the temperatures of said inner and outer tubes;

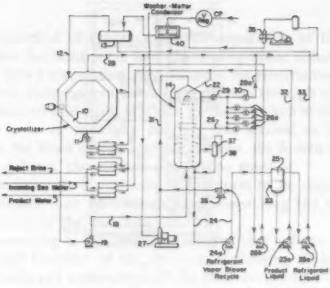
said refrigeration means including a plurality of refrigeration tubes each having a main portion thereof running substantially parallel to said inner and outer tubes and an expansion portion thereof coiled about said inner tube within said vacuum chamber, said coiled portions being operative to permit said refrigeration tubes to expand or contract along the lengths thereof during thermal changes, each of said refrigeration tubes being located at different selected radial distances between said inner and outer tubes.

3,992,170

METHOD AND APPARATUS FOR MELTING ICE IN SALINE WATER CONVERSION SYSTEMS

George B. Karnofsky, Mount Lebanon Township, Allegheny County, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Mar. 20, 1975, Ser. No. 560,124
Int. Cl.² B01D 9/04; C02B 1/12
U.S. Cl. 62—535 **6 Claims**



1. In apparatus for desalination of water, which apparatus includes a freezer having a vapor space in which saline water to be purified and a vaporizable liquid refrigerant are in intimate contact so as to produce a refrigerant vapor and a slurry of ice and brine, a washer in which said slurry of ice and brine are separated and the ice washed, a melter in which the separated ice in a bed is melted by direct condensation upon it of a major portion of said refrigerant vapor, means providing a communication between said freezer vapor space and a vapor space at the feed end of said melter including a primary compressor having a suction inlet via which vaporized refrigerant is received from said freezer and a discharge outlet via which compressed refrigerant vapor is supplied to said melter, means for removing ice melt and refrigerant in both liquid and vapor phases from said melter at a discharge end and also functioning to separate ice melt as product water and to provide separate condensed and vapor phases of refrigerant, and means for recycling that portion of the said refrigerant vapor, remaining after the said major portion is condensed, in condensed form to said freezer, the improvement which comprises an auxiliary blower in a passage connecting the discharge end of the melter to the feed end of said melter for recycling refrigerant vapor to a point downstream of said primary compressor in order to increase the rate at which condensed refrigerant and melted ice flows from the ice bed of said melter.

5. In a freezing process for desalination of water having the steps, cyclic with respect to refrigerant, of:

a. making a slurry of ice and brine by vaporizing refrigerant

b. separating ice from brine

c. compressing said vaporized refrigerant

d. applying said compressed vapor directly to the ice in a bed for melting the ice and condensing refrigerant
e. separating refrigerant uncondensed in step (d) from refrigerant condensed in step (d)
f. decanting melted ice from condensed refrigerant
g. withdrawing melted ice as product water
h. and recycling refrigerant condensed in step (d) to step (a)

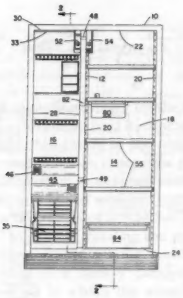
the improvement which comprises the additional step of recycling directly to the point of application of the compressed vapor to the ice bed of step (d) refrigerant vapor separated from the condensed refrigerant in step (e) whereby the rate at which condensed refrigerant and melted ice flows from said ice bed is increased.

3,992,171

REFRIGERATOR FREEZER FORCED AIR SYSTEM

Norman Jenewein, Cedar Rapids, Iowa, assignor to Amana Refrigeration, Inc., Amana, Iowa

Filed Nov. 10, 1975, Ser. No. 630,445
Int. Cl.[2] F25D *17/06, 13/02*
U.S. Cl. 62—419 **10 Claims**



1. A side by side combination refrigerator-freezer having an insulated cabinet defining a refrigerator compartment and an adjacent freezer compartment separated by an insulated partition wall, comprising:

a refrigeration system including a single vertically disposed evaporator of the finned coil type to cool air circulated therethrough;

a forced air circulation system having a vertically disposed, air passageway which includes a back wall of the freezer compartment, the vertically disposed evaporator being positioned within the air passageway so that air may pass between the fins of the evaporator;

means forming an upper air outlet adjacent the upper end of the air passageway and means forming a lower air outlet adjacent the lower end of the passageway;

means providing a main opening from the freezer compartment into the air passageway adjacent the midsection of the evaporator;

means disposed adjacent the main opening for moving air through the midsection opening into the passageway such that a portion of the moving air may be moved upwardly across the upper portion of the evaporator and exit out the upper opening into the freezer compartment and another portion of the air may be moved downwardly across the lower portion of the evaporator and exit out the lower opening into the freezer compartment;

a laterally extending air supply duct providing for air flow from the passageway into the refrigerator compartment; and

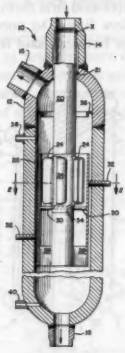
a laterally extending air return duct providing for air flow from the refrigerator compartment into the freezer compartment.

3,992,172

SEPARATOR ARRANGEMENT FOR START-UP SYSTEM

Charles R. Clark, Oradell, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Mar. 6, 1975, Ser. No. 556,038
Int. Cl.[2] B01D *45/12*
U.S. Cl. 55—427 **6 Claims**



1. A fluid separating apparatus comprising a substantially vertically oriented cylindrical housing, inlet means disposed in the upper portion of said housing for receiving a mixture of liquid and vapor, a riser pipe disposed in said housing and communicating with said inlet means for receiving said mixture, at least one discharge slot formed through said riser pipe, a skirt disposed in said housing and extending between said riser pipe and the inner wall of said housing, said skirt surrounding said slot and forming a solid baffle, an arcuate shaped discharge member registering with said at least one slot for receiving said mixture and discharging it against said skirt to create centrifugal forces to facilitate the separation of said liquid from said vapor, said liquid collecting on said skirt and falling to the lower portion of said housing by gravitational forces and said vapor rising to the upper portion of said housing by buoyant forces, an outlet disposed in the lower portion of said housing for permitting the liquid to discharge from the housing, an outlet formed in the upper portion of said housing to permit the vapor to discharge from the housing and means for supporting said riser pipe relative to said housing while permitting relative movement between said riser pipe and said housing in an axial direction in response to relative thermal expansion and contraction therebetween.

3,992,173

AIR FILTER AND METHOD OF MAKING SAME

Charles E. Wharton, Lake Forest, and Clarence Bell, Chicago, both of Ill., assignors to Korhumel Industries, Inc., Chicago, Ill.

Filed Apr. 24, 1975, Ser. No. 571,382
Int. Cl.[2] B01D *46/10*
U.S. Cl. 55—501 **19 Claims**

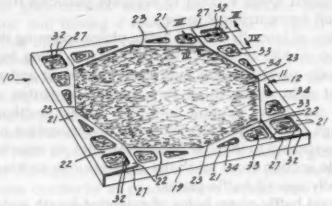
1. An air filter having a porous filter medium body layer of substantial thickness, said filter layer having a plurality of angularly related edges defining corner areas of the layer, said layer being supported in a complementary unitary frame folded up from a single blank of sheet material, the frame comprising:

perforated main panel supportingly engaging one face of said filter layer and having boundaries substantially coextensive with the edges of the filter medium layer;

a respective folded up narrow edge panel of substantially the same width as the thickness of the filter layer being

joined on a fold line along each boundary of said main panel, and each of said edge panels being disposed in face-to-face contiguous relation to the edge of the filter layer nearest to it;

a narrow respective retainer panel joined along a fold line to the distal end of each of said edge panels, and said retainer panels overlying said filter layer;



each of said retainer panels having a central cutout providing a substantial gap such that at the opposite sides of the gap the retainer panel has respective coplanar flange extensions;

said flange extensions of contiguous retainer panels being in overlapping relation to one another over said corner areas of the filter layer; and

means securing said overlapping flange extensions to one another.

3,992,174

SPECIMEN CAPSULE AND PROCESS FOR GAS CHROMATOGRAPHY

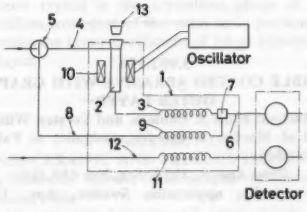
Sigeru Nakamura; Mitsuru Taguchi, both of Yokohama; Satoru Naniwada, Hoya, and Naoki Ohguri, Hachioji, all of Japan, assignors to Japan Analytical Industry Co. Ltd. and Showa Denko Kabushiki Kaisha, both of Tokyo, Japan

Division of Ser. No. 337,712, March 2, 1973, Pat. No. 3,879,181. This application Dec. 13, 1974, Ser. No. 532,537

Claims priority, application Japan, Mar. 9, 1972, 47-24250; Mar. 9, 1972, 47-24251; May 8, 1972, 47-44583

Int. Cl.² B01D *15/08*

U.S. Cl. 55—67 **2 Claims**



1. A process for analysis of a solid or liquid specimen, comprising the steps of wrapping said solid or liquid specimen in a foil or net of ferromagnetic metal to form a specimen capsule, inserting the specimen capsule into a vaporizer of a pyrolysis gas chromatograph, exposing the wrapped specimen to alternate current induction to cause the ferromagnetic metal to radiate heat and thereby vaporize the specimen wrapped therein, and introducing the vaporized components of the specimen into a column of the pyrolysis gas chromatograph.

3,992,175

METHOD OF AND DEVICE FOR CHROMATOGRAPHIC SEPARATION OF FLUID MIXTURES INTO FRACTIONS

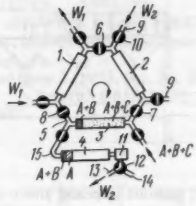
Toe Jokhannesovich Klementi, ulitsa Pukhkekodu tee, 46, kv. 1; Toivo Elmar-Jokhannesovich Kruusimagi, ulitsa Tiiva, 18, kv. 1, and Jüri Arturovich Veisserik, ulitsa Mustamyae tee, 193, kv. 84, all of Tallin, U.S.S.R.

Continuation of Ser. No. 559,558, March 18, 1975, abandoned. This application Dec. 1, 1975, Ser. No. 636,651

Claims priority, application U.S.S.R., Feb. 11, 1974, 1995195; Mar. 15, 1974, 2005441

Int. Cl.² B01D *15/08*

U.S. Cl. 55—67 **5 Claims**



1. A method of chromatographic separation of fluid mixtures into fractions using four chromatographic columns connected into a circulation path adapted for simultaneous passing of two independent carrier gas streams through separated series parts of said path, in which method at each moment one column acts as enriching column, the second as stripping column, the third as regenerating column, the fourth acting as eluting column, the method comprising steps of:

a. continuously introducing the mixture to be separated at constant flow rate into a pipe connecting the stripping column to the enriching column;

b. recovering at the outlet of the enriching column a preselected fraction of the mixture containing at least one preselected component of the mixture mixed with other less strongly adsorbed components of the mixture;

c. feeding said preselected fraction of the mixture into the eluting column;

d. rearranging the columns so that the previously regenerating column now acts as the enriching column, the previously enriching column acting as stripping column and the previously stripping column now acting as regenerating column;

e. recovering a fraction of the mixture enriched in more strongly adsorbed components of the mixture at the outlet of the renererating column; and

f. separating said preselected fraction in said eluting column into at least two fractions from which one fraction is enriched in said preselected component with recovery of said fractions at the outlet of the eluting column; the separation and recovering of the fractions enriched in less strongly adsorbed components of the mixture and in said preselected component being carried out by means of the first carrier gas stream, the recovering of the fraction enriched in more strongly adsorbed components being carried out by means of the second carrier gas stream.

3,992,176

DRY SCRUBBING TAR AND FLUORIDE LADEN GASES

Philip W. Bohne; Michael R. Cuccia, both of Metairie, La., and Tom S. Moughon, Jr., Golden Dale, Wash., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 409,051, Oct. 24, 1973, abandoned. This application Nov. 6, 1974, Ser. No. 521,412

Int. Cl.² B01D *53/06*

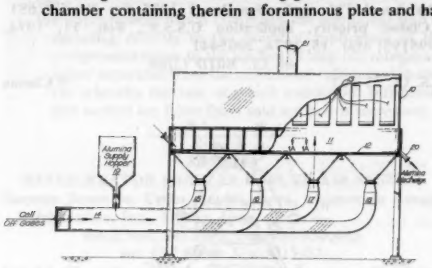
U.S. Cl. 55—71 **11 Claims**

1. A method of treating a gaseous stream containing fluo-

ride and heavily laden with condensable carbonaceous matter comprising:

a. introducing pulverulent alumina into a moving gaseous stream containing gaseous fluoride and heavily laden with condensable carbonaceous matter to entrain therein said alumina and to cause said carbonaceous matter to condense onto said alumina;

b. directing said alumina containing gaseous stream into a chamber containing therein a foraminous plate and having pulverulent alumina disposed above said foraminous plate;



c. passing said alumina-containing gaseous stream through said foraminous plate so as to maintain the alumina above said plate in a turbulent condition, thereby removing essentially all gaseous fluoride from the gaseous stream; and

d. subsequently removing essentially all particulate matter from said gaseous stream.

3,992,177

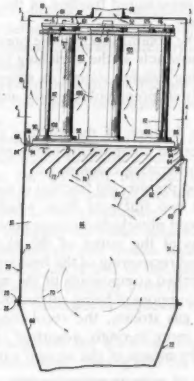
MULTI-ACTION PARTICLE SEPARATOR

Carl Welteroth, 123 Bay Ave., Highlands, N.J. 07732

Filed May 28, 1975, Ser. No. 581,506

Int. Cl.² B01D *50/00*

U.S. Cl. 55—288 **7 Claims**



1. An improved, multi-action particle separator for separating air suspended particles comprising:

an elongated, vertically oriented sheet metal enclosure, said enclosure being rectangular in horizontal cross section, said enclosure comprising interconnected upper, middle and lower sections,

said lower section being in the form of an inverted frusto-pyramid defined by four edge connected, inclined sidewalls,

a cover overlying the top of said enclosure,

a horizontal gate closing off the bottom of said lower section,

an inclined inlet duct fixed to the side of the middle section of said enclosure at the top thereof and opening into said enclosure, said inlet duct being inclined such that inlet air and suspended particles moving through said inlet duct directly impact the inclined sidewall of said enclosure lower section on the side of the enclosure opposite that carrying said inclined inlet duct and effect in conjunction with an oppositely inclined sidewall of said inverted frusto-pyramid lower section to separate particles from the inlet air by centrifugal force,

a plurality of laterally spaced baffle plates spanning the top of said middle section, said baffle plates being inclined generally parallel to the axis of the inlet duct and generally at right angles to air flow moving by vortex action from the lower section into the middle section and through said baffle plates into the upper section of said enclosure and to thereby impact the inlet air entering the middle section from said inlet duct prior to striking said laterally spaced baffle plates,

one of said baffle plates being of extended length and being fixed to the side and within the enclosure and being in line with the upper wall of the inlet duct and acting as an extension thereof to further direct the inlet air and suspendced particles through said middle section for direct impact against the inclined sidewall of the inverted frust-pyramid lower section,

a plurality of vertical, laterally spaced tubular filter bags mounted within the upper enclosure section and being open interiorly to the middle separator section above said baffle plates and being closed off at their upper ends,

means within said upper enclosure section for carrying said plurality of filter bags such that air is forced to flow into the interior of the filter bags,

a separator air discharge duct mounted on the cover and open to the space between the tubular filter bags, and

blower means for inducing air flow from said inlet duct through said enclosure and out said discharge duct;

whereby, particle separation is effected by gravity due to air velocity decrease in said middle section, centrifugal force as a result of vortex action within said lower section, particle impingement between inlet air particles and suspended particles within the air stream moving upwardly from the lower section through said middle section and into the upper section, particle impingement within said middle section by impact with said baffle plates and dust bag filtering of the smaller sized particles within the upper section prior to relatively clean air discharge at the top of the upper section.

3,992,178

FLEXIBLE COATED ABRASIVE WITH GRAPHITE OUTER LAYER

Erik L. Markoo; Hans S. Ekblom, and Torsten Wilhelm Sandell, all of Markaryd, Sweden, assignors to Fabrika AB EKA, Sweden

Filed Apr. 9, 1974, Ser. No. 459,410

Claims priority, application Sweden, Apr. 17, 1973, 7305416

Int. Cl.² B24D *11/00*

U.S. Cl. 51—295 **4 Claims**

1. In a flexible abrasive article, comprising a flexible backing, an adhesive layer on said backing, and abrasive grits embedded in said adhesive layer, the improvement comprising an outer layer coated over said adhesive layer and said grits, said outer layer comprising an adhesive containing graphite particles having a size from 0.1 to 100 microns, the amount of graphite being from 1 to 100 grams per square meter of said abrasive article and sufficient to provide said outer layer with an electrical resistance of less than 5 megohm as measured between points 1 cm. apart.

3,992,179

GLASS CERAMIC AND PROCESS THEREFOR

George A. Simmons, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 558,238, June 17, 1966, abandoned. This application May 17, 1971, Ser. No. 144,314
Int. Cl.² C03C 21/00, 3/22
U.S. Cl. 65—30 E 2 Claims

1. A process of making an article having a main body portion of glass-ceramic and an integral surface layer of glass-ceramic and having a lower coefficient of linear expansion than that of the main body portion which comprises

1. forming an article from a thermally crystallizable glass comprising magnesia, alumina and silica in an overall composition, including nucleant and an oxide of an alkali metal present in a concentration of at least 1% by weight, based on soda mole equivalent, said glass being capable of bulk crystallization to form an article of glass-ceramic by the heat treatment in which the crystalline phase contains cordierite as predominant crystal, and
2. heat treating the article to convert the glass to glass-ceramic, and
3. converting a surface layer of the article to a glass-ceramic under conversion conditions such that the surface layer that is obtained is integral with the main body portion and has a lower coefficient of linear expansion than that of the main body portion, said converting comprising

I. substituting lithium for at least part of said other alkali metal in said surface layer by ion-exchange treatment, and

II. heat treating the article to convert the surface layer to glass-ceramic containing at least one material selected from the group consisting of beta-eucryptite and beta-spodumene as predominant crystal having said lower expansion coefficient as compared with the glass-ceramic of the main body portion, whereby the article formed has a flexural strength greater than the initial article of glass-ceramic, said surface layer obtained having an overall composition substantially identical to that of the main body portion except that

a. the lithia content is at least equal to the lithia content in the overall composition of the main body portion,
b. the content of oxide of other alkali metal, having an ionic radius larger than lithium, is at a maximum equal to the content of that oxide in the overall composition of the glass-ceramic main body portion, and
c. when the layer is a glass-ceramic with lithia content equal to that of the main body portion, the predominant crystal in the crystalline phase of the layer differs from that of the main body portion and provides the lower coefficient of linear expansion of the layer.

3,992,180

GLASS-CERAMIC AND PROCESS THEREFOR

George A. Simmons, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 558,238, June 17, 1966, abandoned. This application May 17, 1971, Ser. No. 144,310
Int. Cl.² C03C 3/22, 23/00
U.S. Cl. 65—33 2 Claims

1. A process of making an article of glass-ceramic which comprises

1. Forming an article from a thermally crystallizable glass containing at least one ingredient that combines with alumina and silica to provide bulk crystallization by a heat treatment, a nucleant present in sufficient concentration for the bulk crystallization, and an oxide of an alkali metal in a concentration that inhibits the rate of said bulk crystallization without preventing surface crystallization of said glass,
2. heat treating the article of glass at an elevated temperature sufficient to provide crystallization of a surface layer of the article while the main body portion remains a glass, and
3. heat treating the surface cyrstallized article at a higher elevated temperature to convert the main body portion by bulk crystallization to a glass-ceramic,

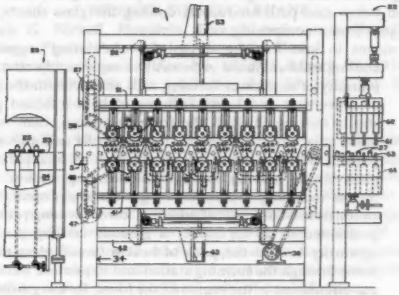
each of said at least one ingredient being present in a sufficient concentration in the thermally crystallizable glass to provide, in absence of said rate-inhibiting alkali metal oxide, bulk crystallization uniformly throughout the article.

3,992,181

SHAPING GLASS SHEETS

Robert G. Frank, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 583,332
Int. Cl.² C03B 23/02
U.S. Cl. 65—104 10 Claims



1. In the roll forming method of shaping heatsoftened sheets by a mass production method comprising

moving a series of flat sheets along a path defined by a conveyor,

heating each sheet in said series to its deformation temperature,

conveying each moving sheet of said series along said path through a shaping station comprising upper and lower rotating forming rolls of complementary curvature while said sheet is at its deformation temperature,

lifting said moving sheet on at least some of said lower rotating forming rolls off said path and into engagement with at least some of said upper rotating forming rolls,

engaging said moving sheet between said rotating forming rolls for sufficient time to impress a shape into said deformable sheet and then

lowering said moving sheet on at least some of said lower rotating forming rolls to redeposit said shaped sheet on said path before said sheet moves beyond said shaping station,

and repeating said steps of lifting, engaging and lowering for each sheet in said series that is conveyed through said shaping station,

the improvement comprising applying a cooling medium within said shaping station toward the lower surfaces of said moving glass sheets while the latter move between said upper and lower forming rolls while being conveyed along said lower forming rolls in an amount sufficient to superficially cool said lower surfaces of said glass sheets and to reduce a temperature difference that would develop between the upper forming rolls and the lower forming rolls in the absence of said application of cooling medium due to the difference in time that said upper forming rolls and said lower forming rolls contact said moving sheets while the latter are at their deformation temperature.

8. In an apparatus for shaping a series of glass sheets by the roll forming method in a mass production operation comprising a heating furnace for heating glass sheets to their softening temperature and having means to convey the sheets of glass therethrough along a generally horizontal path; a roll forming station having opposed upper forming rolls and lower forming rolls of complementary curvature, conveyor rolls located in spaces between said lower conveyor rolls defining a horizontal path of glass movement and aligned to receive heat-softened glass leaving said heating furnace, and means for periodically bringing said upper and lower forming rolls together so as to bend successive sheets of heat-softened glass as they are being conveyed therebetween, whereby each sheet of heat-softened glass rests on a portion of said lower forming rolls for a period of time greater than the period of engagement with said upper forming rolls, thereby creating an unbalanced, detrimental accumulation of heat in at least some of the lower forming rolls; and a quenching station including conveyor means for receiving bent sheets of glass from said forming station and transporting them aong a horizontal path through the quenching station, and cooling means in the quenching station above and below said path for rapidly cooling the glass shee*s; the improvement comprising:

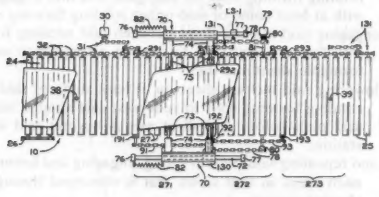
means in said forming station for circulating a gaseous cooling medium more vigorously in regions adjacent to a plurality of said lower forming rolls and beneath the path of movement and lower surfaces of heat-softened glass sheets moving through the forming station, than in regions adjacent to said upper forming rolls and above the path of movement and upper surfaces of heat-softened glass sheets moving through the forming station; said means including a plurality of gas nozzles disposed between at least one pair of adjacent lower forming rolls and positioned so as to deliver a gaseous cooling medium upwardly toward the path of heat-softened glass movement through the forming station and to provide a cooling gas circulation in the region of the lower forming rolls and the lower surfaces of the heat-softened glass sheet moving through the forming station, whereby the accumulaion of heat in the lower forming rolls is substantially offset.

3,992,182

CONVEYING SHEETS AT NON-UNIFORM SPEED

Robert G. Frank, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 18, 1974, Ser. No. 507,033
Int. Cl.² C03B *35/00*
U.S. Cl. 65—163 **6 Claims**



5. In a method of conveying a series of sheets along a conveyor at a non-uniform speed comprising rotating a first series of conveyor rolls at a first speed, rotating a second series of conveyor rolls spaced from said first series of rolls at a second speed faster than said first speed,

rotating a selected series of conveyor rolls comprising a plurality of subseries of said selected series disposed in end to end relation to bridge the space between said first series and said second series at a time cycle of a combination of said first speed and said second speed while a series of glass sheets is conveyed over said rotating conveyor rolls,

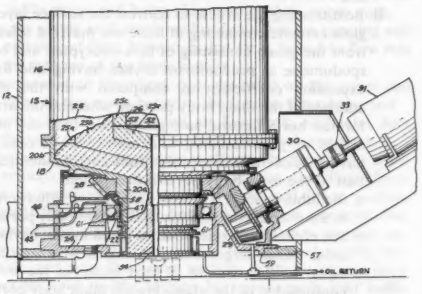
the improvement comprising orienting and aligning each sheet in said series of sheets by engaging the edge of said sheet with orienting and aligning means moving downstream at said first speed while said sheet travels on rolls rotating at said first speed from an upstream position to a downstream position, rotating all of said selected rolls simultaneously and in unison at said second speed where said glass sheet is completely over said selected series and after said orienting and aligning step has been completed to transfer said sheet downstream of said downstream position, and, when said sheet reaches said downstream position, moving said orienting and aligning means upstream in the direction opposite the direction of sheet movement of said upstream position for orienting and aligning the next sheet in said series of sheets, and reducing the speed of each subseries of said selected series of rolls in turn whenever the trailing edge of said sheet passes beyond said subseries of rolls.

3,992,183

APPARATUS FOR REFINING GLASS

Robert R. Rough, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 494,133, Aug. 2, 1974, abandoned, which is a continuation of Ser. No. 321,771, Jan. 8, 1973, abandoned. This application Jan. 20, 1975, Ser. No. 542,691
Int. Cl.² C03B *5/16*
U.S. Cl. 65—178 **2 Claims**



2. Apparatus for refining glass comprising a shell said shell supported for rotation within a housing, said shell comprising an intermediate cylindrical portion;

a pair of frusto-conical end portions, each end portion having an axially extending portion which is smaller in diameter than the cylindrical portion of the shell;

a top bearing;

a bottom bearing, each of said bearings having an inner race and an outer race, a plurality of balls interposed between the bearing races;

said top bearing inner race being positioned about the surface of the axially extending portion of the shell;

said bottom bearing inner race positioned about the surface of the bottom axially extending portion of the shell;

said top and bottom bearings in contact with portions of the axially extending portions of the shell; said bearings supported within said housing by end plates;

said shell being rotatable within the said housing;

a bottom bearing support comprising laterally extending end plates, having a circular flange and said end plate forming a bottom for said housing and having a circular flange, said flange resting on portions of said housing flange, a circular catch pan positioned so as to encircle the lower axially extending portion of said shell and positioned above the lower bearing assembly;

said axially extended lower portion of the shell having a plurality of passages formed in the surface of the extend-

ing portion, a portion of the passage being formed by a surface of the inner bearing race;

oil supply pipelines, one pipeline being positioned so as to discharge cooling oil into the circular catch pan;

said circular catch pan and said passages connected forming a flow path for cooling oil; and

means for collecting and returning said spent cooling oil so that the cooling oil flowing in the passages between the axially extending portions and the inner races bearing acts as a coolant and prevents the expansion of the axially extending portion against the inner race of the bearing.

3,992,184

SLOW-RELEASE FERTILIZERS

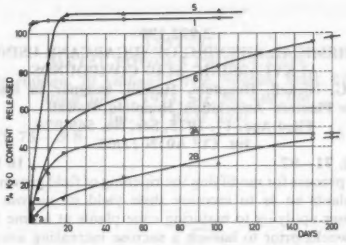
Peter John Baldock, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 13, 1975, Ser. No. 549,803

Claims priority, application United Kingdom, Feb. 19, 1974, 7431/74

Int. Cl.² C05D *11/00*

U.S. Cl. 71—62 **6 Claims**



1. A fertilizer from which potassium is released slowly, comprising a frit produced from a potassium/silicon composition in the range $K_2O.2SiO_2$ to $K_2O.4SiO_2$ and containing from 5.5% to less than 10% by weight of the frit of calcium oxide.

3,992,185

DITHIO AND THIOL CARBAMATES AS PLANT GROWTH REGULANTS

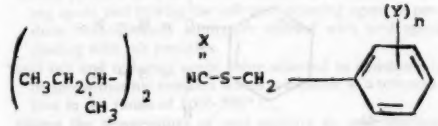
John J. D'Amico, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 19, 1975, Ser. No. 559,843

Int. Cl.² A01N *9/12*

U.S. Cl. 71—76 **9 Claims**

1. A method of reducing the stature of leguminous plants comprising treating said plants with an effective, non-lethal plant growth regulating amount of a compound of the formula



wherein X is S or 0; Y is F, or Cl in the 4 position when X is 0, and *n* is 0 or 1.

3,992,186

TETRAHYDROFUROIC HYDRAZIDE FOR RIPENING SUGARCANE

Louis G. Nickell, Honolulu, Hawaii, assignor to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Filed Apr. 5, 1974, Ser. No. 458,430

Int. Cl.² A01N *9/00*

U.S. Cl. 71—88 **5 Claims**

1. A process for modifying the ripening of field grown sugarcane so as to increase its yield of sucrose which comprises applying tetrahydrofuroic hydrazide in a sucrose increasing amount to the cane at a time from 2 to 10 weeks prior to harvest.

3,992,187

AMINOPENICILLANIC ACID OR PENICILLAMINE AS RIPENER FOR SUGARCANE

Louis G. Nickell, Honolulu, Hawaii, assignor to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Continuation-in-part of Ser. No. 455,955, March 28, 1974, Pat. No. 3,897,239. This application Feb. 25, 1975, Ser. No. 552,921

Int. Cl.² A01N *9/12*

U.S. Cl. 71—90 **11 Claims**

1. A process for modifying the ripening of field grown sugarcane plants so as to increase their yield of sucrose which comprises applying to the cane plants at a time from 2 to 10 weeks prior to harvest a sucrose increasing amount of a ripening agent selected from the group consisting of 6-aminopenicillanic acid, sodium, potassium and ammonium salts of 6-aminopenicillanic acid, penicillamine, and hydrochloride, sulfate and phosphate salts of penicillamine.

3,992,188

HERBICIDAL MIXTURES OF PYRIDAZONES AND PHENYLSULFONYL METHANESULFONE o-ALKYLBENZENE

Adolf Fischer, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 484,974, July 1, 1974, Pat. No. 3,933,460. This application Sept. 2, 1975, Ser. No. 609,434

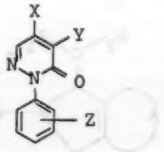
Claims priority, application Germany, July 9, 1973, 2334787

Int. Cl.² A01N *9/22*

U.S. Cl. 71—92 **2 Claims**

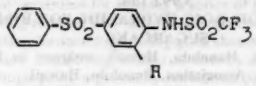
1. A herbicide composition consisting essentially of an inert carrier having dispersed therein a herbicidally effective amount of

a. a compound having the formula



in which X denotes amino, methylamino, dimethylamino or diethylamino; Y denotes chloro or bromo; and Z denotes hydrogen, trifluoromethyl, or methyl, and

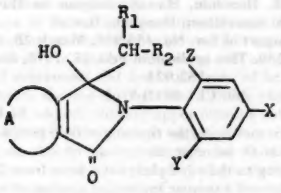
b. a compound having the formula



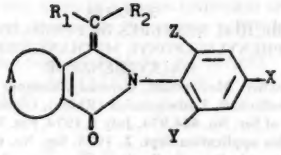
wherein R denotes lower alkyl
in a weight ratio of *a* to *b* in the range of 3:1 to 1:3.

3,992,189
HERBICIDAL ISOINDOL-1-ONE DERIVATIVES
Steven Jerome Goddard, West Grove, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.
Filed Oct. 31, 1975, Ser. No. 627,887
Int. Cl.² A01N *9/22*; C07D *209/46*
U.S. Cl. 71—96 **18 Claims**

1. A compound of the formulae

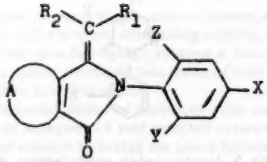


Formula I



Formula IIa

or



Formula IIb

Wherein
R_1 is hydrogen or methyl;
R_2 is hydrogen or alkyl of 1 to 4 carbons;
X is fluorine, chlorine or bromine;
Y is hydrogen or fluorine;
Z is hydrogen or fluorine, provided that when Y and Z are both fluorine, X must also be fluorine; and
A is $-(CH_2)_4-$ or $-CH=CH-CH=CH-$, provided that when A is $-CH=CH-CH=CH-$ and Y is hydrogen, Z must be fluorine.

7. A composition for the control of undesirable vegetation consisting essentially of a compound of claim **1** and at least one of (a) surface-active agent and (b) a solid or liquid diluent.

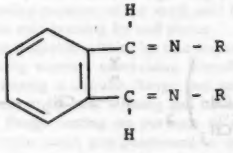
13. A method for the control of undesirable vegetation comprising applying to the locus of such undesired vegetation a herbicidally effective amount of a compound of claim **1**.

3,992,190
CHEMICAL RIPENING OF SUGARCANE USING ALKYLARSINIC ACID COMPOUNDS
Louis G. Nickell, Honolulu, Hawaii, assignor to Hawaiian Sugar Planters' Association, Honolulu, Hawaii
Filed Apr. 17, 1975, Ser. No. 569,074
Int. Cl.² A01N *11/08*
U.S. Cl. 71—97 **10 Claims**

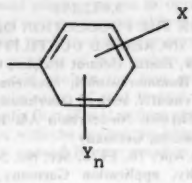
1. A process for modifying the ripening of field grown sugarcane plants so as to increase their yield of sucrose which comprises applying to maturing cane plants at a time from 2 to 10 weeks prior to harvest a sucrose increasing amount of cacodylic acid, sodium cacodylate or mixtures thereof.

3,992,191
N,N'-(O-PHENYLENEDIMETHYLIDYNE)-BIS-SUBSTITUTED ANILINES
John J. D'Amico, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.
Filed Nov. 28, 1975, Ser. No. 636,000
Int. Cl.² C07C *119/00*
U.S. Cl. 71—121 **12 Claims**

1. A compound having the formula



wherein R is



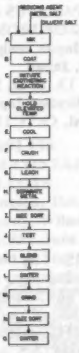
X and Y are independently selected from the group consisting of methoxy, trifluoromethyl and chloro; and n is zero or 1.

3,992,192

METAL POWDER PRODUCTION

Haig Vartanian, 29 Anthony Circle, Newton, Mass. 02160

Filed July 1, 1974, Ser. No. 484,780
Int. Cl.² B22F 9/00
U.S. Cl. 75—.5 B 5 Claims



1. Process for producing a high capacitance metal powder selected from the group consisting of tantalum and columbium comprising,

mixing particles of a salt of said metal with a molten reducing agent and stirring the salt and reducing agent to produce homogeneous admixture thereof with said agent coating said salt particles,

said salt and reducing agent being selected as constituents of an exothermic reaction which is initiable at a temperature in the range of 100°–500° C.,

raising the temperature of said mixture to said reaction initiating temperature and stirring,

continuing said stirring while the exothermic reaction proceeds,

and thereafter maintaining melting temperature of all reaction products excepting the metal freed by the reaction by addition of heat thereto for a period of at least 15 minutes,

and continuing stirring during said reaction period and for at least an initial portion of said hold period under the said conditions to cause the large scale order of the reaction products to be essentially continually broken down and to produce homogeneous admixture of unconsumed reactants and products,

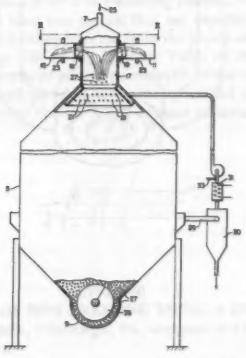
then cooling the reaction products and freeing metal powder from said reaction products.

3,992,193

METAL POWDER PRODUCTION BY DIRECT REDUCTION IN AN ARC HEATER

Maurice G. Fey, Pittsburgh, Pa., and Edna A. Dancy, Beaconsfield, Canada, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1975, Ser. No. 557,154
Int. Cl.² B22F 9/00
U.S. Cl. 75—.5 B 1 Claim



1. A process for producing metal powder by direct reduction of an ore, comprising the steps of:

a. introducing a finely divided ore consisting essentially of an oxide of the metal into an arc heated plasma gas to effect reduction of the oxide to elemental liquid metal droplets, the elemental metal having a melting point of not more than the temperature of the chemical reduction reaction, and

b. quenching the elemental metal droplets by expansion through a nozzle, the nozzle being located at the exit end of the reaction zone.

3,992,194

METHOD AND APPARATUS FOR USE IN THE TREATMENT OF METALS IN THE LIQUID STATE

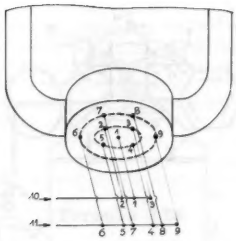
Pierre Leroy, Saint-German-en-Laye, and Jean Bastien, L'Etrat, both of France, assignors to Creusot-Loire, Paris, France

Filed Mar. 13, 1975, Ser. No. 558,111

Claims priority, application France, Apr. 11, 1974. 74.12784

Int. Cl.² C21C *5/34*

U.S. Cl. 75—52 **9 Claims**



1. In the treatment of a metal in the liquid state by blowing into the bath under the bath level at least one fluid in the form of jets emitted from submerged blast pipes, the improvement comprising arranging the jets in at least two groups, supplying the groups with refining fluid at independently adjustable positive pressures such that one of the groups of jets is fed at a lower fluid pressure to provide relatively low impetus jets and another of the groups of jets is fed at a fluid pressure which is substantially higher to provide high impetus jets.

3,992,195

PROCESS FOR THE PRODUCTION OF STEEL WITH INCREASED DUCTILITY

Wilhelm Klapdar, Essen; Helmut Richter, Oberhausen; Heinrich-Wilhelm Rommerswinkel, Mulheim; Edgar Spetzler, and Jochen Wendorff, both of Oberhausen, all of Germany, assignors to Thyssen Niederrhein AG Hütten- und Walzwerke, Oberhausen, Germany

Filed Apr. 18, 1975, Ser. No. 569,150

Claims priority, application Germany, Apr. 20, 1974, 2419070

Int. Cl.² C21C *7/02*

U.S. Cl. 75—58 **5 Claims**

1. A process for the production of steel of high ductility comprising the steps of: (a) deoxidizing a sulfur-containing starting steel melt; (b) maintaining the deoxidized steel melt in a ladle having a lining free from siliceous oxides; (c) covering said steel melt with a synthetic slag substantially free from siliceous oxides; (d) slowly injecting a calcium-containing treating agent in fine-grain particulate form into said melt at a depth of at least 2000 mm in a carrier gas to desulfurize and purify said melt; and (e) maintaining the rate of introduction of said calcium-containing agent in step (d)

at most equal to the rate at which said agent is able to react with said melt, said agent being introduced into said melt over a period of at least five minutes in a total quantity of at least 0.6 kg of calcium per ton of steel.

3,992,196

METHOD AND APPARATUS FOR THE CONTINUOUS REFINING OF IRON AND ALLOYS

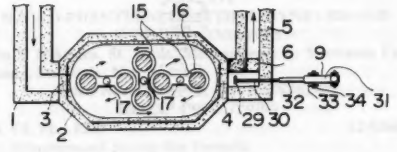
Ryo Ando, Kawasaki, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed June 13, 1972, Ser. No. 262,249

Claims priority, application Japan, June 25, 1971, 46-45617

Int. Cl.² C21C *7/00*

U.S. Cl. 75—61 **8 Claims**



1. A method of continuously refining a material selected from the group consisting of iron and iron alloys comprising the steps of continuously admitting molten pig iron into a stationary stirring tank from one side thereof, said stirring tank having an oval horizontal cross-section and being provided with a plurality of equally spaced apart parallel mechanical vertical stirring means disposed in the longitudinal direction of said oval cross-section, discharging said molten pig iron from the opposite side of said stirring tank thereby causing said molten pig iron to flow in said longitudinal direction, incorporating an additive into said stirring tank and rotating

adjacent ones of said stirring means in opposing directions with adjacent ones of said stirring means being in intermeshed relationship such that the loci of adjacent stirring means overlap for stirring the portions of said molten pig iron near the interface between said molten pig iron and said additive thereby effecting admixture of said molten pig iron in said stirring tank due to the flow of said molten pig iron and admixture of said additive with the molten pig iron at said portions near said interface caused by the rotation of said stirring means.

3,992,197

SILVER CRYSTALS AND PRODUCTION THEREOF

Paul W. Wetzold, 1 Colonial Court, Armonk, N.Y. 10504

Filed Mar. 18, 1975, Ser. No. 559,532
Int. Cl.² C22B *11/04*
U.S. Cl. 75—118 R 8 Claims

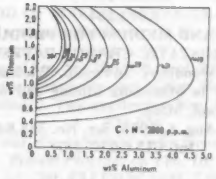
1. A method of producing thin flat crystals of silver comprising rapidly mixing with agitation and at a temperature in the range of 30°–80° C. a water solution of a soluble inorganic silver salt containing a chelating agent for ferric iron with a water solution of ferrous sulfate containing sulfuric acid and additional chelating agent for ferric iron, thereby causing thin flat crystals of silver to form, and promptly stabilizing the crystals which are formed by the addition of a protective colloid.

3,992,198

DUCTILE CHROMIUM-CONTAINING FERRITIC ALLOYS

Joseph J. Demo, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation of Ser. No. 371,951, June 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 153,259, June 15, 1971, abandoned, which is a continuation-in-part of Ser. Nos. 51,283, June 30, 1970, abandoned, and Ser. No. 886,620, Dec. 19, 1969, abandoned, and Ser. No. 847,296, Aug. 4, 1969, abandoned. This application May 7, 1975, Ser. No. 575,403
Int. Cl.² C22C *38/28*
U.S. Cl. 75—124 11 Claims



1. A ferritic stainless steel consisting essentially of, besides iron and incidental impurities, 19–35 weight per cent Cr, C and N collectively up to 0.28 weight per cent as charged (0.15 weight per cent as analyzed), and Al and Ti to levels giving compositions included within the areas bounded by the curves, on the concave sides thereof, the ordinate axis, Ti in weight per cent of 0.05 minimum and 2.2 maximum and Al = 5.0 weight per cent excluding, however, alloys containing 29–35 weight per cent Cr having a combined Al + Ti content below 0.1% total, of at least one of the group consisting of FIGS. 1, 1′,2, 2′, 3, 3′, 4, 4′, 5 and 5′ where said curves are not closed, and within the areas bounded by said curves exclusively where said curves are closed, corresponding values of Al and Ti for intervening Cr contents being determined, to a close approximation, by linear interpolation along normals drawn from either of any one of any given pair of adjacent curves towards the other of said given pair of adjacent curves and for intervening C+N contents being determined, to a close approximation, by linear interpolation from the ordinate and abscissa axes of a given pair of adjacent plots for a preselected iso-chromium value.

3,992,199

METHOD OF MAKING ELECTRICAL CONTACT MATERIALS

Lloyd F. Neely, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Division of Ser. No. 421,276, Dec. 3, 1973, Pat. No. 3,951,872. This application Dec. 18, 1975, Ser. No. 641,750
Int. Cl.² B22F *3/16*
U.S. Cl. 75—200 10 Claims

1. A method of making a highly conductive-refractory metal containing type electrical contact material consisting essentially of about 12 wt.% to about 69 wt.% of electrically conductive metal selected from Ag and Au and mixtures thereof, about 30 wt.% to about 85 wt.% total of at least two refractory constituents selected from W, Mo and Ta, and an effective amount up to about 6 wt.% of a bonding constituent consisting essentially of at least two metals that are capable of forming an alloy with each other selected from the group of Cu and the metals of Group VIII of the Periodic Table of the Elements comprising the steps of mixing powders of all the constituents, pressing the mixed powders into a compact and sintering the compact to provide the electrical contact material.

3,992,200

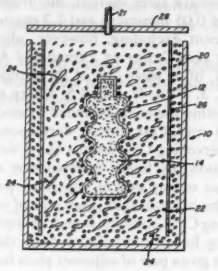
METHOD OF HOT PRESSING USING A GETTER

Vijay K. Chandhok, Pittsburgh, Pa., assignor to Crucible Inc., Pittsburgh, Pa.

Filed Apr. 7, 1975, Ser. No. 565,878
Int. Cl.² B22F *3/14*
U.S. Cl. 75—211 4 Claims

1. In a method for producing a compacted powder metallurgy article by forming an assembly by introducing powder metal to a porous mold corresponding generally to the configuration of said article and placing said mold in a container sealed against the atmosphere and having a secondary pressure media in solid, particle form therein, outgassing said assembly, heating said assembly to elevated temperature for compacting and compacting said powder by the application of pressure to said assembly while at elevated temperature, the

improvement comprising mixing with said secondary pressure media a reactive metal selected from the group consisting of



titanium, zirconium, hafnium, and mixtures thereof, whereby during said heating the reactive metal absorbs oxygen and nitrogen present with the secondary pressure media.

3,992,201

FILAMENTS FOR FLUORESCENT LAMPS

Ronald C. Koo, Weehawken, and Joel Shurgan, Washington Township, Bergen County both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Division of Ser. No. 223,607, Feb. 4, 1972, Pat. No. 3,812,393, which is a continuation-in-part of Ser. No. 66,275, Aug. 24, 1970, Pat. No. 3,662,789. This application Mar. 4, 1974, Ser. No. 447,482

Int. Cl.² G01F *1/22*; H01B *1/02*

U.S. Cl. 75—207 **9 Claims**

1. A filament for an electric lamp made from tungsten wire having a predetermined amount of impurities before annealing comprising annealed tungsten wire existing after removal from a base material on which it was annealed at an elevated temperature, the annealed wire having substantially the same impurities therein as was present in the wire before annealing.

3,992,202

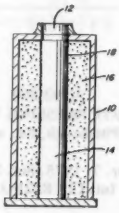
METHOD FOR PRODUCING APERTURE-CONTAINING POWDER-METALLURGY ARTICLE

Edward J. Dulis; James N. Fleck, both of Upper St. Clair Township, Allegheny County, and Joseph W. Powell, Verona, all of Pa., assignors to Crucible Inc., Pittsburgh, Pa.

Filed Oct. 11, 1974, Ser. No. 514,042

Int. Cl.² B22F *3/14*

U.S. Cl. 75—222 **6 Claims**



1. A method for producing a powder metallurgy article having an aperture therein, said method comprising providing a dense core having a configuration corresponding to that of said aperture desired in said article and having a coefficient of thermal expansion greater than that of said article, placing said core in a particle charge of a composition corresponding to that desired in said article, with the position of said core relative to said particle charge corresponding to the desired relative position of said aperture, providing a separating medium between said core and particle charge, sealing said charge and core in a collapsible container to form an assembly, hot isostatically compacting said assembly to produce a densified article from said particle charge with said core not being substantially deformed during said compacting, cooling said assembly and removing said container and said core from said densified article.

3,992,203

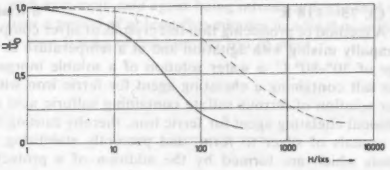
POLYPHENYLENEVINYLENE PHOTOCONDUCTOR COMPOSITION SENSITIZED WITH A 1,4-BIS (STYRYL) BENZENE DERIVATIVE

Hans-Heinrich Horhold; Joachim Gottschaldt; Regina Bergmann; Johannes Opfermann, all of Jena; Walter Seliger, Dresden; Siegfried Augst, Dresden, and Hartmut Arnstadt, Dresden, all of Germany, assignors to VEB Pentacon Dresden, Germany

Filed Apr. 18, 1975, Ser. No. 569,577

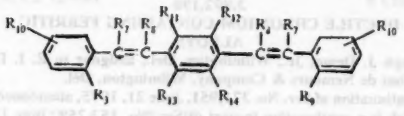
Int. Cl.² G03G *5/06*

U.S. Cl. 96—1.5 **3 Claims**



1. Electrophotographic recording material comprising at least one photoconductive polyphenylenevinylene having a mean molecular weight greater than 2,000 g/mol in admixture with at least one 1,4-bis(styryl) benzene derivative.

2. Electrophotographic recording material according to claim 1, wherein the or each 1,4-bis-(styryl) benzene derivative corresponds to formula (3).



in which at least one of the radicals R_7 and R_8 signifies a cyano group and the remaining radicals R_9 to R_{14} are similar or different and signify hydrogen, cyano, alkoxy, alkyl, aryl, halogen, nitro or amino groups.

3,992,204

METHOD AND MEDIUM FOR PRODUCING ELECTROSTATIC CHARGE PATTERNS

Allen L. Taylor, Woodbury Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 6, 1973, Ser. No. 385,849

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **36 Claims**

1. A process for producing a latent electrostatic charge pattern on the surface of an insulative layer forming a portion of a copy medium that also includes an electrically conductive layer, and a photoconductive layer that is interposed between

said insulative layer and said electrically conductive layer, one of which insulative and conductive layers is radiation transmissive, which process comprises the steps of:

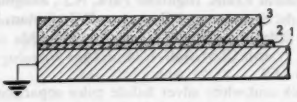
1. forming an electrostatic charge of one polarity on the upper surface of said insulative layer and an electrostatic charge of the opposite polarity on the lower surface thereof;
2. transferring a portion of the charge on the upper surface of said insulative layer to the elctrically conductive layer such that the voltage potential on the upper surface of said insulative layer becomes substantially zero with respect to said conductive layer; and
3. selectively exposing said photoconductive layer to radiation.

3,992,205

ELECTROPHOTOGRAPHIC RECORDING MATERIAL CONTAINING A PLURALITY OF DYES WITH DIFFERENT SPECTRAL ABSORBTION CHARACTERISTICS

Wolfgang Wiedemann, Geisenheim-Johannisberg, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Oct. 22, 1974, Ser. No. 517,031
Int. Cl.² G03G *5/09*
U.S. Cl. 96—1.6 **22 Claims**



1. Electrophotographic recording material comprising an electrically conductive carrier material having thereon a photoconductive multi-layer system of at least one charge carrier producing dyestuff layer of organic material and an insulating, organic, covering layer thereon with at least one charge carrier transporting compound, said dyestuff layer comprising at least two pigment dyes absorbing in different spectral regions of the visible spectrum of about 420 to about 750 nm, at least one dye absorbing in the region of relatively long waves and at least one dye absorbing in the region of relatively short waves, the pigment dye absorbing in the region of relatively long waves being a phthalocyanine dye compound.

3,992,206

METHOD OF MAKING LENTICULAR SURFACES

Robert L. Lamberts, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 290,938, Sept. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 186,130, Oct. 4, 1971, abandoned. This application Nov. 15, 1974, Ser. No. 524,026
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² G03C *5/00, 5/04*
U.S. Cl. 96—35 **19 Claims**

1. A method of producing an array of cylindrical, lenticular elements on the emulsion surface of a photographic material having operating and frequency response curves in accordance with the photographic characteristics of the emulsion, each of the elements having the same predetermined profile, comprising the steps of:

forming a light modulating target having a cyclical, one-dimensional, profile pattern of the lenticular elements, the profile pattern being mathematically related to the cross section of the predetermined profile and the operating and frequency response curves of the emulsion;

establishing an exposure for the photographic material in accordance with the sensitometric characteristics thereof;

positioning the light modulating target in the object plane of an optical system including a cylindrical lens, the optical system sharply imaging the target profile so as to produce an extending pattern of parallel equal exposure levels normal to the target profile, as represented by spaced parallel lines, in a plane including the emulsion surface of the photographic material;

exposing the photographic material in accordance with the established exposure to a source of light modulated by the target pattern; and

processing the photographic material so as to produce on the emulsion surface a relief image comprising the array of cylindrical lenticular elements having the same predetermined profile.

4. A method of producing an array of lenticules on the emulsion surface of a photographic material having operating and frequency response curves in accordance with the photographic characteristics of the emulsion, each of the elements having the same predetermined cross section, comprising the steps of:

forming a first light modulating target having a first cyclical pattern of predetermined profile for the lenticule cross section in one direction, the pattern being mathematically related to the cross section and the operating and frequency response curves of the emulsion;

forming a second light modulating target having a second cyclical pattern of predetermined profile for the lenticule cross section in an other direction perpendicular to the one direction, the pattern being related to the cross section in the other direction and the operating and frequency response curves of the emulsion;

establishing an exposure for a first and a second photographic material on which the first and second targets are to be exposed, respectively;

positioning successively the first and second targets in the object plane of an optical system including a cylindrical lens, the optical system sharply imaging the targets so as to produce with respect to each cyclical pattern an extending pattern of parallel, equal exposure levels normal to the profile patterns, as represented by spaced parallel lines, in a plane including the emulsion surface of the first and second photographic materials, respectively;

exposing successively the first and second photographic materials in accordance with the established exposure to a source of light modulated, respectively, by the first and second cyclical patterns;

processing the first and second photographic materials to produce respective first and second images comprising parallel regions of equal density corresponding, respectively, to the first and second cyclical patterns;

superimposing the first and second photographic materials in the object plane of a second optical system such that the parallel regions of equal density are oriented relative to one another at an angle greater than zero;

exposing the photographic material positioned in the image plane of the second optical system to the superimposed and oriented images on the first and second photographic materials; and

processing the photographic material so as to produce on the emulsion surface thereof a relief image comprising the array of lenticules having the same predetermined cross section.

3,992,207

METHOD OF MANUFACTURING A CATHODE-RAY TUBE FOR THE DISPLAY OF COLORED IMAGES

Dirk Barneveld, and Gerardus Antonius Wilhelmus Vermeulen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1975, Ser. No. 552,979

Claims priority, application Netherlands, Mar. 11, 1974, 7403205

Int. Cl.[2] G03C *5/00*

U.S. Cl. 96—36.1 4 Claims

1. Method of manufacturing a color cathode ray tube including a display screen comprising a large number of areas which luminesce in three different colors, means for producing three electron beams, and a color selection electrode which is formed with a large number of apertures, the said electron beams each being associated by means of the color selection electrode with luminescent areas of one color, said luminescent areas being smaller than the corresponding apertures in the color selection electrode, comprising the steps of:

a. providing on a support for the display screen a first layer of an aqueous solution of polyvinyl alcohol which is sensitized with amonium dichromate which when exposed to actinic radiation becomes insoluble in a solvent but can be removed by an etchant,

b. exposing the said first layer to actinic radiation with the exception of the areas which are assigned to the luminescent areas of a first color,

c. developing the said first layer by dissolving and removing the unexposed areas by mans of the said solvent,

d. providing on the said support a second layer which contains luminescent material of the said first color dissolved in an aqueous solution of polyvinyl alcohol sensitized with a tetrazonium compound or a polydiazonium compound and becomes insoluble by exposure to actinic radiation but is not attacked by the said etchant.

e. exposing the entire second layer to actinic radiation,

f. removing the exposed areas of the said first layer together with the portions of the second layer disposed on these exposed areas by treating both layers with the said etchant,

g. repeating the steps a) to f) for the luminescent areas of a second color, and

h. repeating the steps a) to f) for the luminescent areas of a third color.

3,992,208

PHOTO-SENSITIVE ETCHANT AND METHOD FOR FORMING METAL IMAGE USING SAME

Masayoshi Nagata; Gyoji Suzuki, and Takeshi Tomotsu, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 12, 1974, Ser. No. 450,514

Claims priority, application Japan, Mar. 12, 1973, 48-28708; Apr. 2, 1973, 48-37961

Int. Cl.[2] G03C *5/00*

U.S. Cl. 96—36 15 Claims

1. A photo-sensitive etchant comprising a compound capable of producing, upon exposure to light, a metal film-etching substance or a substance which reacts with another substance to form a metal film-etching substance; a substance capable of producing water upon exposure to light; a binder; and a dryable coating solvent which does not detrimentally affect a metal film surface to which said photo-sensitive etchant is applied.

3,992,209

IMAGEWISE DISTRIBUTION OF SULFATE GROUPS ON SUBSTRATE POLYMER BY PHOTOGRAPHIC TECHNIQUES

Floyd B. Erickson, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 405,215, Oct. 10, 1973, Pat. No. 3,897,255, which is a division of Ser. No. 190,337, Oct. 18, 1971, Pat. No. 3,801,320. This application May 29, 1975, Ser. No. 581,983

Int. Cl.[2] G03C *1/76*

U.S. Cl. 96—67 1 Claim

1. A coated structure in which the coating bears a latent image comprised of portions containing sulfate groups and portions not containing sulfate groups, in which the differential concentrations of sulfate groups, are dependent upon the degree of light exposure in an imagewise exposure to light, and wherein the sulfate groups are present as substituents on unsaturated polymers represented by the structure

where M represents hydrogen, metal or other moiety capable of forming a salt with the sulfate anion.

3,992,210

SILVER HALIDE FILMS WITH CONTROLLED GRADIENT BALANCE

Warren William Evans, Highland Park, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 5, 1973, Ser. No. 367,332

Int. Cl.[2] G03C *1/76, 7/16, 1/02*

U.S. Cl. 96—69 9 Claims

1. A black-and-white silver halide color-separation film in which the various colored gradients are balanced in relation to each other when all color records are machine-processed under identical processing conditions, which comprises a support coated with at least two black-and-white silver halide emulsions, either mixed or in separate layers and prepared from the same halides, one of said emulsions containing a fully panchromatic spectral sensitizer and another emulsion containing a sensitizer more sensitive to the visible red region of the spectrum than the green, and wherein the red gradient of the film is greater than the blue and green gradients, and the blue and green gradients are substantially equal.

3,992,211

ELECTROLESS PLATING COMPOSITION

Merceline L. Skoll, Milwaukee, Wis., assignor to Trans-Metals Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 742,492, July 15, 1968, which is a continuation-in-part of Ser. No. 462,758, June 9, 1965, abandoned, which is a continuation-in-part of Ser. No. 374,845, June 12, 1964, abandoned. This application June 11, 1971, Ser. No. 152,412

Int. Cl.[2] C23C *3/02*

U.S. Cl. 106—1 1 Claim

1. An electroless plating solution for plating a base material, consisting essentially of a water solution having dissolved therein, a water soluble metal salt, an acidic component selected from the group consisting of gluconic acid, glucono delta lactone, and water soluble salts of gluconic acid, and a water soluble hydrolyzed carbohydrate, said carbohydrate being present in a concentration greater than 5 grams per 100 ml of said solution and said solution having pH in the range of 0.5 to 7.0 said solution also including from .001 to 0.1 grams per 100 ml of solution of a substance selected from the group consisting of phytol and guanylic acid.

3,992,212

ELECTRICAL RESISTOR INKS

Karl J. Youtsey, Chicago; William C. Holt, Jr., Prospect Heights, and Robert D. Carnahan, Barrington, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 281,880, Aug. 18, 1972, Pat. No. 3,846,140. This application Sept. 12, 1974, Ser. No. 505,405

The portion of the term of this patent subsequent to Mar. 21, 1989, has been disclaimed.

Int. Cl.² C09D 5/24, 11/08

U.S. Cl. 106—1 11 Claims

1. In an electrical resistor ink comprising a resistive component dispersed in a liquid vehicle containing a binder of synthetic or natural resin and an oil solvent or mixture thereof, the improvement which comprises utilizing as a resistive component therefor from about 10% to about 90% by weight of a composition of at least one refractory inorganic oxide having a surface area of from 1 to about 500 square meters per gram with a mono-layer of a carbonaceous pyropolymer formed on the surface thereof, said semi-conducting pyropolymeric material being of a particle size of less than 20 microns and having a resistivity at room temperature of from about 10^{-2} to about 10^{9} ohm-centimeters.

3,992,213

HETEROGENEOUS REFRACTORY COMPOUNDS

Maurice M. Desouches, Avignon, and Alain Le Sech, Entraigues, both of France, assignors to L-Electro-Refractaire, France

Continuation of Ser. No. 215,649, Jan. 5, 1972, abandoned. This application June 21, 1974, Ser. No. 481,812

Claims priority, application France, Jan. 8, 1971, 71.00529

Int. Cl.² C04B 35/48

U.S. Cl. 106—57 1 Claim

1. An unfired heterogeneous refractory composition useful for producing ultimate refractory products having a homogeneous resistance to corrosion from the corrosive medium present in glass furnaces, said composition consisting essentially of:

90 to 30% by weight of a grog consisting essentially of a refractory material selected from the group consisting of alumina and substances consisting essentially of at least two of silica, alumina and zirconia, said grog having a granulometry greater than 100 microns; and

10 to 70% by weight of a fine part consisting of particles having a granulometry of less than 40 microns, the percentages by weight of grog and of fine part being given with respect to the total weight of these two constituents, said particles consisting essentially of from 0 to 70% by weight of alumina and from 30 to 100% by weight of a substance consisting of at least 70% by weight of zirconia, said particles having a silica content which is less than 30% by weight of their zirconia content, said particles having a resistance to said corrosive medium which is higher than that of said grog material.

3,992,214

REFRACTORY CASTABLE

Daniel Ralph Petrak, Irwin, Pa., and Thomas Franklin Foltz, Westboro, Mass., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 14, 1974, Ser. No. 497,443

Int. Cl.² C04B 35/44, 35/02, 33/00, 35/52

U.S. Cl. 106—65 8 Claims

1. A refractory castable consisting essentially of about 20 to 30% calcium aluminate cement, about 1 to 10% silicon carbide and the balance a heat resistant aggregate, said silicon carbide being sized such that substantially all of it is +35 mesh.

3,992,215

PHARMACEUTICAL SUSPENSION FOR OPAQING EMPTY GELATIN CAPSULES

Kenneth S. E. Su; Ronald R. Snyder, and R. Ray Scott, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed May 8, 1975, Ser. No. 575,563

Int. Cl.² A61K 47/00; C09C 1/36; C09K 3/00

U.S. Cl. 106—287 SB 6 Claims

1. A pharmaceutical suspension for opaquing empty gelatin capsules comprised of: a) titanium dioxide; b) glycerin; c) sodium lauryl sulfate; d) fluid dimethyl-polysiloxane; e) sodium citrate, and f) water.

3,992,216

LIGHTWEIGHT AGGREGATE FOR CONCRETE AND METHOD FOR MAKING SAME

Leon I. Kirschner, 7650 Lavergne Ave., Skokie, Ill. 60076

Filed July 24, 1974, Ser. No. 491,399

Int. Cl.² C04B 15/00

U.S. Cl. 106—288 B 7 Claims

1. An aggregate in pelletized form consisting of finely divided base material of the class consisting of rock, cinders, pumice, perlite, slag, and clay, as one ingredient and finely divided magnetic oxide of iron, as the other ingredient, intermixed therewith in the proportion of about 2 to 7% by weight of iron oxide to base material, said mixture being in bloated form by having been heated to a temperature of the order of about 2,000° F., said aggregate being characterized by great porosity, and substantial compressive strength, whereby when present in concrete utilizing such aggregate, such concrete has relatively light weight and normal compressive strength.

3,992,217

COMPOSITION OF CALCIUM CARBOALUMINATES AND OF TOBERMORITES, PROCESS FOR ITS MANUFACTURE AND ITS APPLICATION

Jacques Baudouin, Montelimar, and Jean-Pierre Caspar, Le Teil, both of France, assignors to Lafarge (Societe Anonyme), Paris, France

Filed Nov. 1, 1974, Ser. No. 520,102

Int. Cl.² C04B 7/06, 31/02

U.S. Cl. 106—306 6 Claims

1. A calcium-alumino composition of hydrated calcium carboaluminates and tobermorites essentially consisting of:

hydrated calcium mono-carboaluminates: from about 42 to about 87 percent by weight;

tobermorites ($xCaO.\ y\ SiO_2.\ z\ H_2O$ with $0.4 \leq x/y \leq 3$ and $0.5 \leq z/y \leq 6$): from about 58 to about 3 percent, which may contain free hydrated silica in from about 0 to about 11 percent by weight being counted as SiO_2.

3,992,218

BLACK COLORING AGENT

Kensuke Suetsugu; Eiji Maruyama, and Katsuyuki Same, all of Kita-Kyushu, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed May 2, 1975, Ser. No. 574,244

Claims priority, application Japan, May 2, 1974, 49-49567; May 8, 1974, 49-50872

Int. Cl.² C09C 1/48

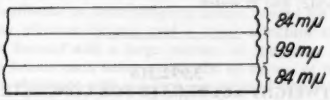
U.S. Cl. 106—307 11 Claims

1. A carbon black coloring agent obtained by (1) mixing a hydrophobic vehicle with an aqueous slurry contaning a carbon black obtained by treating a furnace black having a electromicroscopic average particle size of from about 5 to about 35 mμ with a modifier selected from the group consisting of ozone, nitric acid, hydrogen peroxide, chromic acid and permanganate, and (2) removing the water.

3,992,219
ZINC AND MANGANESE PIGMENTS

David William Harold Clark, Monkwood, England, assignor to May & Baker Limited, Essex, England

Continuation-in-part of Ser. No. 194,616, Nov. 1, 1971, abandoned. This application June 20, 1974, Ser. No. 481,231
Claims priority, application United Kingdom, June 10, 1974, 25674/74
Int. Cl.² C09C 1/04
U.S. Cl. 106—291 20 Claims



1. Essentially plate-like particles of a zinc or manganese salt consisting essentially of the ion of the salt and: (i) sulphide ions or (ii) in the case of zinc salts, sulphide and oxide ions, or (iii) in the case of zinc salts, oxide ions.

3,992,220
COMPOUND OF A CALCIUM TRISULFOALUMINATE BASE, AND PROCESS FOR ITS MANUFACTURE

Jacques Baudouin, Montelimar, and Jean-Pierre Caspar, Le Teil, both of France, assignors to Lafarge (Societe Anonyme), Paris Cedex, France

Filed Nov. 11, 1974, Ser. No. 522,902
Claims priority, application France, Nov. 9, 1973, 73.40027
Int. Cl.² C09C 1/02, 1/28, 1/40
U.S. Cl. 106—306 2 Claims

1. In the process forming a composition essentially consisting of about 67 per cent by weight of calcium trisulfoaluminate, about 33 per cent by weight of tobermorites, and possibly silica, the steps comprising:

hydrating white Portland cement with water in excess of that needed for hydration, with agitation, and subsequently

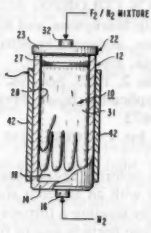
combining hydrated aluminum sulfate and said hydrated white Portland cement, and

allowing said aluminum sulfate and hydrated cement to form said composition.

3,992,221
METHOD OF TREATING EXTENSIBLE HYDROCARBON ARTICLES

Charles Albert Homsy; John Lee Margrave, and Ramachandra Brijlal Badachhape, all of Houston, Tex., assignors to Vitek, Inc. and Marchem, Inc., both of Houston, Tex.

Filed Oct. 23, 1975, Ser. No. 625,347
Int. Cl.² B08B 7/02; B29D 31/00
U.S. Cl. 134—16 11 Claims



1. A method of treating a surface of an extensible elastomeric hydrocarbon article, comprising:

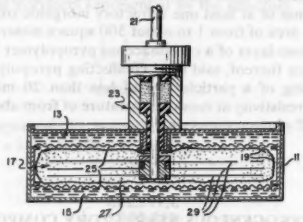
extending said surface by at least 10 percent, and

treating the extended surface with a fluorinating gas mixture, including elemental fluorine.

3,992,222
METALLIC SULFIDE ADDITIVES FOR POSITIVE ELECTRODE MATERIAL WITHIN A SECONDARY ELECTROCHEMICAL CELL

William J. Walsh, Naperville; Charles C. McPheeters, Plainfield; Neng-ping Yao, Clarendon Hills, and Kobuyuki Koura, Hinsdale, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 15, 1975, Ser. No. 596,044
Int. Cl.² H01M 4/38
U.S. Cl. 429—221 2 Claims

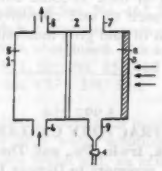


1. In a secondary electrochemical cell including a negative electrode with alkali metal as active material, a positive electrode with a positive-electrode, active material and a molten salt electrolyte intermediate said positive and negative electrodes, the improvement wherein said positive-electrode, active material comprises iron disulfide in a major proportion by weight and a sulfide of cobalt in an amount sufficient to provide a cobalt to iron atom fraction in excess of about 0.1.

3,992,223
METHOD AND APPARATUS FOR REMOVING REACTION WATER FROM FUEL CELLS

Heinrich Gutbier, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Berlin, Germany

Continuation of Ser. No. 95,924, Dec. 7, 1970, abandoned, which is a continuation of Ser. No. 694,252, Dec. 28, 1967, abandoned. This application July 18, 1973, Ser. No. 380,162
Claims priority, application Germany, Jan. 4, 1967, 107724V; Mar. 4, 1967, 108649
The portion of the term of this patent subsequent to Dec. 21, 1988, has been disclaimed.
Int. Cl.² H01M 8/04
U.S. Cl. 429—14 17 Claims



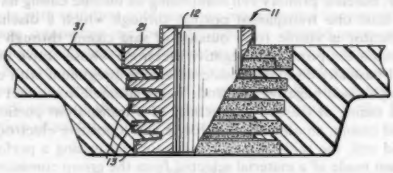
1. Process for the separation of reaction water and waste heat produced by reaction of gases in a fuel cell, which comprises discharging electrolyte containing reaction water and waste heat from the fuel cell and circulating the electrolyte to remove reaction water and waste heat and returning to the fuel cell by passing said electrolyte through an electrolyte chamber outside the fuel cell, said electrolyte chamber being

connected to a water separation chamber with a porous diaphragm permeable to water vapor between the electrolyte chamber and the water separation chamber, passing said electrolyte in contact with the surface of the diaphragm in the electrolyte chamber producing a capillary compression permitting water vapor containing only a portion of said waste heat to diffuse through the diaphragm into said water separation chamber containing pressurized gas, equilibrating hydrostatic pressure of the electrolyte by at least one of the pressures exerted by the gas and the capillary compression in the diaphragm, conducting the water vapor containing only a portion of said waste heat diffused through the diaphragm in contact with a condensation surface continually cooled by a flow of fluid coolant to effect condensation of the water vapor on the condensation surface, passing electrolyte to a cooling zone wherein another portion of the waste heat is abstracted without removal of water from the electrolyte and returning electrolyte after removal of reaction water and waste heat to said fuel cell.

3,992,224
INHIBITION OF LIQUID AND VAPOR TRANSMISSION THROUGH PLASTIC-SUBSTRATE SEALS

Ivor R. Fielding, Naperville; Wassily Poppe, Lombard; Michael M. Schwartz, Aurora, and James P. Whelan, West Chicago, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 29, 1974, Ser. No. 528,415
Int. Cl.² H01M 2/00, 2/08
U.S. Cl. 29—623.5 **15 Claims**



1. A method of constructing a seal between a battery terminal bushing and a plastic lid comprising:

a. covering the battery terminal bushing with a polymer powder blend formed from particles with diameters of less than 250 microns comprising from 25 to 100 parts by weight of a polyolefin selected from the group consisting of polypropylene, a polypropylene-polyethylene copolymer and blends thereof and from 75 to 10 parts by weight of a polycarbonamide which is compatible with the polyolefin;

b. baking the covered bushing for 2 to 10 minutes at 190° to 230° C. to form a continuous coating;

c. cooling the baked bushing; and

d. molding plastic about the bushing to form a battery lid.

3,992,225
PRINTED CIRCUIT BOARD BATTERY PACK

John E. Sykes, Dallas, Tex., assignor to Mauratron Incorporated, Dallas, Tex.

Filed Oct. 28, 1975, Ser. No. 626,135
Int. Cl.² H01M 2/10
U.S. Cl. 429—1 **20 Claims**

1. In combination with a plurality of batteries of the type having male and female snap connectors mounted at their opposite ends, the improvement comprising:

first circuit board means comprising a substantially flat, planar member formed from a dimensionally stable, electrically insulative material;

at least one male snap connector mounted on one side of the first circuit board means for engagement with a female snap connector of one of the batteries to form an electrical connection therewith;

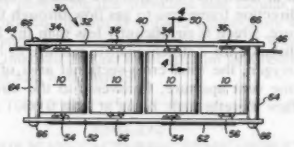
at least one female snap connector mounted on the same side of the first circuit board means for engagement with a male snap connector of one of the batteries to form an electrical connection therewith;

printed circuit means formed on the first circuit board means and electrically interconnecting the male and female snap connectors mounted thereon;

a layer of electrically insulative material formed on the side of the first circuit board means having the printed circuit means thereon and extending over the printed circuit means;

second circuit board means comprising a substantially flat, planar member formed from a dimensionally stable, electrically insulative material;

at least one male snap connector mounted at one side of the second circuit board means for engagement with a female snap connector of one of the batteries to form an electrical connection therewith;



at least one female snap connector mounted on the same side of the first circuit board means for engagement with a male snap connector of one of the batteries to form an electrical connection therewith;

printed circuit means formed on the second circuit board means and forming electrical terminals extending to the male and female snap connectors mounted thereon;

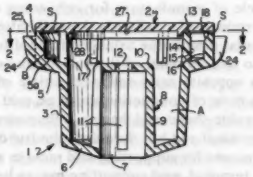
a layer of electrically insulative material formed on the side of the second circuit board means having the printed circuit means thereon and extending over the printed circuit means; and

means positioning the first and second circuit board means in a spaced apart relationship to receive the batteries therebetween with the male snap connector of the first circuit board means facing and aligned with the female snap connector of the second circuit board means and with the female snap connector of the first circuit board means facing and aligned with the male snap connector of the second circuit board means.

3,992,226
ANTI-EXPLOSION CAP FOR STORAGE BATTERIES

James B. Godshalk, Yardley, Pa., assignor to Ultra-Mold Corporation, Willow Grove, Pa.

Filed July 25, 1975, Ser. No. 598,742
Int. Cl.² H01M 2/12
U.S. Cl. 429—89 **23 Claims**



1. In an anti-explosion cap for closing at least one filling opening or vent opening of a storage battery, the combination of

a hollow main body adapted to close at least one battery opening and comprising

an annular side wall, and

a transverse wall extending across the interior space defined by said annular side wall and having an opening communicating between the interior of said hollow main body and the interior of the battery when the cap is in place,

said annular side wall having an end portion which is directed away from the battery when the cap is in place and which includes an annular surface; and

a closure member having a portion which extends across said end portion and includes an annular portion cooperating with said annular surface to define at least one vent aperture,

said closure member being secured to said main body to seal against escape of gas from within the cap save via said at least one vent aperture when the pressure within the battery and the cap exceeds that of the surrounding atmosphere,

said at least one vent aperture having a dimension, in a direction transverse to gas flow through the vent aperture, which is significantly less than the flame quench distance for a stoichiometric mixture of hydrogen and oxygen, the total cross-sectional area of said at least one vent aperture, transverse to the direction of gas flow therethrough, being at least 0.0001 sq. in.

3,992,227

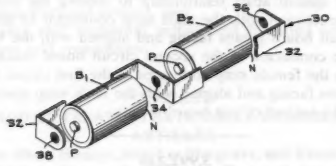
DRY CELL BATTERY CONTACTOR

Russell C. Persson, 661 San Felipe St., Salinas, Calif. 93901

Filed Sept. 29, 1975, Ser. No. 617,363

Int. Cl.² H01M 2/20

U.S. Cl. 429—121 **12 Claims**



1. An article of manufacture for enhancing connection to one of the terminals of a cylindric dry cell battery of the type having a circular post at one axial end thereof for establishing connection to one terminal of the battery, the other terminal being on the opposite axial end, said article of manufacture comprising a mass of conductive shavings, said mass being of generally circular shape and having a diameter greater than the central terminal and less than the cylindric diameter of the battery, and means for supporting said mass in alignment with said circular terminal, said supporting means being formed of insulating material having first and second parallel faces spaced from one another by a distance less than the axial extent of said mass, said mass having portions extending between the faces of said supporting means to establish electrical continuity between opposite axial extremities thereof.

3,992,228

ELECTRIC PRIMARY CELL COMPRISING A VISUAL INDICATOR OF ITS STATE OF CHARGE

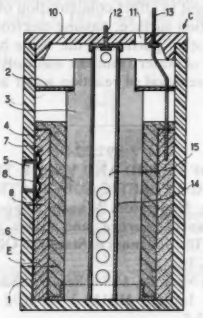
Pierre Depoix, Poitiers, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville and Compagnie Industrielle des Piles Electriques "Cipel", Levallois-Perret, both of, France

Filed Oct. 23, 1975, Ser. No. 625,201

Claims priority, application France, Oct. 31, 1974, 74.36411

Int. Cl.² H01M 10/48

U.S. Cl. 429—90 **6 Claims**



1. Electric primary cell comprising an outside casing having at least one transparent portion through which a discharge indicator is visible from outside of said casing through said transparent portion, a negative electrode whose active material basically contains powdered zinc impregnated with electrolyte, said negative electrode being situated in contact with the casing at least in the vicinity of a transparent portion of said casing, an alkaline electrolyte and a positive electrode in said cell, the said discharge indicator comprising a perforate sheet made of a material selected from the group consisting of copper and its colored alloys and positioned at any selected depth of the total thickness of said negative electrode so as to be visible externally through said transparent portion of said casing, said sheet being in contact with the negative active material impregnated with electrolyte and being thus coated with a film of zinc which film during discharge of the cell becomes converted to zinc oxide and in such conversion results in reappearance of the original color of said sheet visible through said transparent portion.

3,992,229

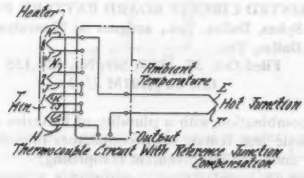
THERMOELECTRIC DEVICE

Bertie F. Hall, Jr., 3568 Kipling Road, Berkley, Mich. 48072

Continuation of Ser. No. 706,071, Feb. 16, 1968, abandoned. This application Mar. 12, 1971, Ser. No. 123,901

Int. Cl.² H01V 1/00

U.S. Cl. 136—227 **16 Claims**



1. A thermoelectric system comprising: a measuring thermocouple having an effective hot junction and an effective cold junction and having a known thermal voltage versus

temperature curve with said effective hot junction being in a location at an elevated temperature to be measured, a thermoelectric reference voltage compensating device comprising a first hot and a first cold junction means for providing a first output potential in response to a difference in temperature between said first hot and cold junction means, first hot junction means comprising at least one hot junction thermoelectrically defined by a first pair of thermoelectrically dissimilar electrically conductive materials, said first cold junction means being with the said cold junction of said measuring thermocouple at a location at ambient temperature and comprising at least one cold junction thermoelectrically defined by a second pair of dissimilar electrically conductive materials, the same as said first pair, said first and second pairs of dissimilar electrically conductive materials having a predetermined thermoelectric characteristic of converting thermal energy to electrical energy being a thermal voltage differential between said dissimilar materials having a magnitude generally insensitive to changes in temperature at said first hot junction means over a substantially wide predetermined range of temperatures of at least 100° F at said hot junction means and having a thermal voltage versus temperature response at said ambient temperature to provide at said first cold junction means variations in thermal voltage for variations in temperature similar to that of said known thermal voltage versus temperature curve of said measuring thermocouple, heating means operatively connected with said first hot junction means for heating and maintaining said first hot junction means to a temperature within said temperature range, said ambient temperature being a noncontrolled temperature in the range of at least 32° F to 100° F, and circuit means electrically connecting said first hot and cold junction means with said measuring thermocouple with said first cold junction means being connected in voltage opposition to the cold junction of said measuring thermocouple whereby variations in said ambient temperature will be compensated and including output conductor means for providing the thermal E.M.F. generated by the system as an indication of the temperature at the location of the hot junction of said measuring thermocouple.

3,992,230

METHOD FOR SURFACE TREATMENT OF ELECTRODE IN DISTRIBUTOR OF INTERNAL COMBUSTION ENGINE FOR SUPPRESSING NOISE

Yoshiro Komiyama, Okazaki; Katsumi Kondo, Toyota; Yoichiro Asano, Toyota, and Mituo Ando, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed June 18, 1975, Ser. No. 588,051

Claims priority, application Japan, June 26, 1974, 49-72274; Feb. 3, 1975, 50-13472

Int. Cl.² B05D *5/12*; **C23C** *11/08*; **F02P** *7/02*; **H04B** *15/02*

U.S. Cl. 148—6.3 **16 Claims**

1. A method for surface treatment of at least one electrode of both the distributor rotor and the stationary terminals in a distributor of an internal combustion engine for noise suppression, wherein finely divided material having a high electrical resistance is applied onto a surface of the electrode to be treated by a plasma arc coating process or a thermo-spraying process or a detonation process to form a surface layer.

3,992,231

TEMPER-STRESSED OIL WELL CASING

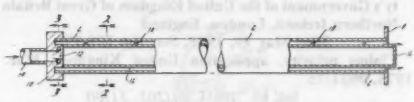
George A. Timmons, Ann Arbor, Mich., assignor to Amax Inc., New York, N.Y.

Filed May 1, 1975, Ser. No. 573,543

Int. Cl.² C21D *9/08*

U.S. Cl. 148—143 **7 Claims**

1. The method of producing temper-stressed oil well casing and tubing having increased resistance to sulfide stress-cracking which comprises the steps of austenitizing a seamless SAE 4100 series low-alloy steel tubular product by heating above the transformation temperature for a period of time sufficient to convert substantially all of the microstructure to the austenite form, quenching the austenitized said steel tubular product to obtain a martensite microstructure, tempering the quenched said steel tubular product to obtain a tempered martensite microstructure throughout by heating to an elevated tempering temperature above about 1000° F and below its transformation temperature, rapidly quenching the inner surface of the heated said tubular product with water to produce a large thermal gradient between the inner surface and



the outer surface of said tubular product and a plastic deformation of the metal in the stratum adjacent said inner surface in response to the differential rate of contraction between said inner stratum and the outer stratum of said tubular product, and thereafter permitting the quenched said tubular product to attain thermal equlibrium at ambient temperature whereby a residual compressive stress in the order of at least about 20,000 psi is imposed on said inner stratum as a result of the contraction of said outer stratum.

3,992,232

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE HAVING OXIDE ISOLATION STRUCTURE AND GUARD RING

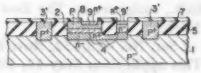
Tadao Kaji; Osamu Yumoto, both of Kokubunji, and Michio Suzuki, Hino, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 474,225, May 29, 1974. This application July 17, 1975, Ser. No. 596,724

Claims priority, application Japan, Aug. 6, 1973, 48-87506

Int. Cl.² H01L *21/76*, *21/22*, *27/04*

U.S. Cl. 148—175 **14 Claims**



1. A method of manufacturing a semiconductor device comprising the steps of:

a. selectively forming a ring-shaped first semiconductor region having a relatively high impurity concentration of a first conductivity type in a principal surface of a semiconductor substrate of said first conductivity type of a relatively low impurity concentration;

b. epitaxially forming a semiconductor layer of a second conductivity type, opposite said first conductivity type, on said principal surface of said substrate;

c. selectively oxidizing said epitaxial layer through the thickness thereof to the principal surface of said substrate except for at least that portion of the epitaxial layer overlying said first semiconductor region and except for an additional portion thereof surrounded by and separated from said ring-shaped first semiconductor region, so that oxidized material of said epitaxial layer separates and isolates a ring-shaped non-oxidized portion of said epitaxial layer overlying said ring-shaped first semiconductor region from the non-oxidized additional portion of said epitaxial layer; and

d. converting that portion of said epitaxial overlying said first semiconductor region to said first conductivity type.

3,992,233

SURFACE TREATMENT OF III-V COMPOUND CRYSTALS

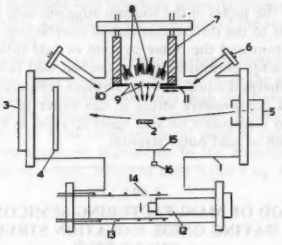
Robin Frederick Charles Farrow, Malvern, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed May 19, 1975, Ser. No. 578,976

Claims priority, application United Kingdom, Mar. 10, 1975, 9921/75

Int. Cl.² H01L *21/203, 31/00*

U.S. Cl. 148—175 **9 Claims**



1. A method of surface treating a group III–V compound material substrate comprising the step of cleaning the substrate by heating said substrate to a temperature above its congruent melting temperature in a vacuum thereby to preferentially evaporate one of the constituent materials of said substrate, and, simultaneous with said heating step, subjecting the substrate to at least one molecular beam of the constituent material which is preferentially evaporating from said substrate thereby to maintain the substrate surface substantially stoichiometric.

3,992,234

POWDERLESS ETCHING METHOD FOR MAGNESIUM PRINTING PLATES

Marvin H. Fishaber, Saginaw, and Philip C. White, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 415,052, Nov. 12, 1973, Pat. No. 3,922,229. This application May 12, 1975, Ser. No. 576,500

Int. Cl.² B41C *1/02*

U.S. Cl. 156—13 **6 Claims**

1. A process for powderless etching of photoengraving plates of magnesium or magnesium alloy which comprises:

a. preparing an etching bath which comprises water and, per liter of bath,

A. from about 70 grams to about 360 grams of 42° Baume nitric acid,

B. from about 0.25 gram to about 5 grams of a sulfated fatty acid ester having from 10 to 24 carbon atoms in the acid moiety and from 1 to 12 carbon atoms in the alcohol moiety,

C. from about 0.25 gram to about 6 grams of a first saturated or olefinically unsaturated carboxylic acid which comprises a hydroxy-unsubstituted monocarboxylic acid of from 2 to 6 carbon atoms, or a polycarboxylic or hydroxy-substituted monocarboxylic acid of from 2 to 8 carbon atoms,

D. from about 2 grams to about 25 grams of a polyhydric alcohol of from 2 to 10 carbon atoms or an ether derivative thereof,

E. from about 2 grams to about 15 grams of a second saturated or olefinically unsaturated carboxylic acid which comprises at least one hydroxy-unsubstituted monocarboxylic acid having from 8 to 24 carbon atoms, and

F. from about 0.25 gram to about 4 grams of an alkylarylsulfonate selected from the group consisting of the alkylbenzenesulfonates wherein the alkyl portion contains from 8 to 18 carbon atoms and the alkylnaphthalenesulfonates wherein the alkyl portion contains from 3 to 18 carbon atoms;

b. maintaining said bath at from about 100°F. to about 115°F; and

c. contacting a plate bearing a photoresist coating image with a said bath until the uncoated portions of the plate have been etched to a satisfactory depth.

3,992,235

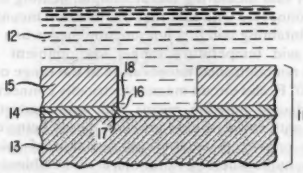
ETCHING OF THIN LAYERS OF REACTIVE METALS

Victor Charles Garbarini, Bethlehem, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 21, 1975, Ser. No. 579,313

Int. Cl.² H01L *21/441*

U.S. Cl. 156—13 **6 Claims**



1. Method for the etching of a reactive metal layer comprising contacting a device precursor with an etchant wherein the device precursor includes a substrate, at least one partially exposed reactive metal layer and at least one noble metal layer in contact with the reactive metal layer, characterized in that the etchant is an aqueous solution consisting of 0.5 to 5 weight percent HF, 1 to 5 weight percent H_2O_2, 0.01 to 0.1 weight percent of a water soluble tetrazolium compound and a surface modifier, in which the etchant contains from 10 to 50 percent by volume of an alcohol, containing at least two carbons, as the surface modifier, whereby the exposed reactive metal is removed without excessive horizontal attack.

3. A method of claim 1 in which at least one of the reactive metal layers is situated above the noble metal layer, relative to the substrate, and is partially covered by a polymeric protective layer.

3,992,236

RELEASABLE MOUNTING AND METHOD OF PLACING AN ORIENTED ARRAY OF DEVICES ON THE MOUNTING

William R. Wanesky, Wescosville, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

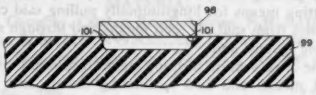
Division of Ser. No. 232,735, March 8, 1972, Pat. No. 3,899,379, which is a division of Ser. No. 64,898, July 30, 1970, Pat. No. 3,690,984, which is a division of Ser. No. 729,859, April 10, 1968, Pat. No. 3,632,074, which is a continuation-in-part of Ser. No. 673,900, Oct. 9, 1967, abandoned. This application July 31, 1975, Ser. No. 600,759

Int. Cl.² B32B *31/02, 31/14*

U.S. Cl. 156—83 **1 Claim**

1. A method of reducing the holding force on an article supported by a layer of pressure sensitive, vacuum holding material selected from the group consisting of silicone rubber and silicone resin, which comprises:

applying a spray of trichloroethylene to the surface of the layer to swell the layer about the article to lift the article; and then



removing the trichloroethylene to reduce the swelling to again hold the article against the layer with a reduced force.

3,992,237

CONNECTIONS FOR INSULATED PIPES

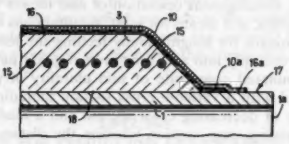
Willem Gerholi, Hardenberg, and Gerrit Heidemann, Oldenzaal, both of Netherlands, assignors to Industriele Ondernemming Wavin N.V., Swolle, Netherlands

Continuation of Ser. No. 300,935, Oct. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 33,227, April 30, 1970, Pat. No. 3,711,124. This application Feb. 6, 1975, Ser. No. 547,644

Claims priority, application Netherlands, Feb. 12, 1970, 7002034

Int. Cl.² B29C *27/00*; B32B *31/00*

U.S. Cl. 156—86 **2 Claims**



1. A method for manufacturing a composite insulated pipe, comprising the steps of:

providing a length of inner pipe;

forming a foamed plastic insulating layer on the outer surface of said pipe in surrounding relationship thereto with said foamed plastic layer terminating at a location spaced inwardly from the end of said pipe;

forming a tape of thermoplastic material in an extruder so that it is heated throughout to such a temperature as to allow heat sealing thereof;

discharging the formed tape from said extruder;

then spirally wrapping the heated tape around the foamed plastic layer prior to the tape as discharged from said extruder being cooled so that adjacent flights thereof overlap one another and become heat sealed together and so that the tape extends over the free outer surface of the pipe adjacent the end thereof; and

permitting the tape to cool and shrink around the foamed plastic layer to form a continuous moisture and gastight covering therearound.

3,992,238

METHOD FOR MOLDING A PROTECTIVE PAD

Herman S. Johns, Gastonia, N.C., assignor to Medical Specialties, Inc., Charlotte, N.C.

Filed Mar. 31, 1975, Ser. No. 563,585

Int. Cl.² B29C *29/00*; B29D *9/00*

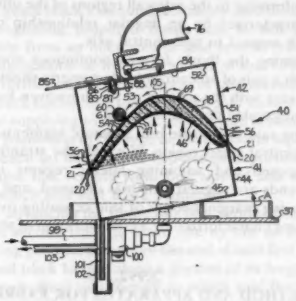
U.S. Cl. 156—93 **13 Claims**

1. A method of molding a protective pad adapted to be positioned on an elbow or heel of a patient and characterized by a generally arcuate cross-sectional configuration, and comprising the steps of

depositing a predetermined amount of a relatively dry, particulate, foam polymeric material having a heat curable adhesive mixed therewith, in a predetermined concave distribution upon an upwardly facing concave mold surface having a plurality of perforations therethrough,

drawing a partial vacuum beneath the concave mold surface such that the vacuum acts through the perforations to maintain the distribution of the foam material upon the concave mold surface,

positioning the concave mold surface having the deposited foam material therein in spaced apart, face to face molding relationship with a convex mold surface such that the concave and convex mold surfaces define a mold cavity



therebetween which is substantially filled with the foam material, and while maintaining the partial vacuum beneath the concave mold surface during the positioning step to maintain the distribution of the foam material in relation to the concave mold surface,

heating the foam material while it is positioned in the mold cavity to thereby cure the adhesive and form a unitary molded product, and then

separating the concave and comvex mold surfaces to release the resulting molded product.

3,992,239

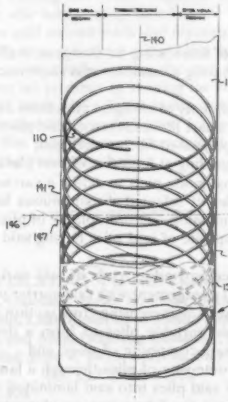
PNEUMATIC TIRE CARCASS CONSTRUCTION

Charles F. Schroeder, Toledo, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 811,930, April 1, 1969, Pat. No. 3,675,702. This application Feb. 19, 1971, Ser. No. 116,984

Int. Cl.² B29H *17/20*

U.S. Cl. 156—133 **1 Claim**



1. The method of making a carcass ply for radial tires comprising:

moving a planar collecting surface in a generally horizontal direction,

depositing on said collecting surface a continuous length of an elongate flexible strand comprising a gathered-together plurality of glass filaments in repeating loops characterized in that the minor axes of said loops are coincident with the longitudinal axis of movement, whereby the central regions of said repeating loops are normal to the central axis of said continuously formed carcass ply of said repeating loops conforming to the tread region of the ultimate tire, while the lateral regions conforming to the sidewall regions of the ultimate tire are characterized by an angular relationship of the strand with respect to said central axis,

combining the thusly formed continuous nonwoven sheet with a pair of vulcanizable elastomeric sheets coextensive in area with the pattern of the nonwoven looped or oval-configurated deposited strand,

cutting said composite into separate segments, each having a central tread region in which the strands are radially disposed and adjoining lateral regions in which the strands are angularly or bias disposed, and

removing marginal edges of said repeating oval, said edges being characterized by a concentration of strand overlap.

3,992,240

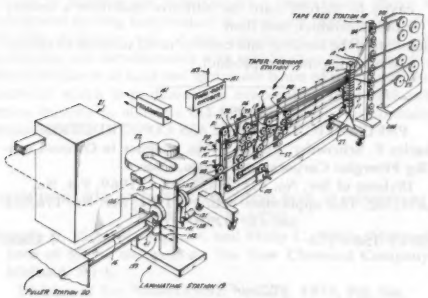
METHOD AND APPARATUS FOR FABRICATING ELONGATE LAMINATED STRUCTURES

Riley Kuehn, Jr., Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 19, 1975, Ser. No. 578,887

Int. Cl.[2] B32B *31/00*

U.S. Cl. 156—250 **22 Claims**



1. A method of fabricating an elongate, multiple ply laminated structure having a variable cross section, comprising the steps of:

feeding a multiplicity of elongate plies from a source thereof into spaced apart planes, each of said plies being formed of resin impregnated fibrous material;

continuously guiding at least one of said plurality of plies in a longitudinal guide path to define a carrier ply to which variable plies of selected discontinuous lengths derived from the remaining said multiplicity of plies are added to form a composite of said plies having said variable cross section;

selectively feeding leading ends of said variable plies into longitudinal engagement with said carrier ply to form said composite with an increasing cross section and selectively severing said variable plies to form a decreasing cross section of said composite of plies; and

pulling said composite of plies through a laminating means to laminate said plies into said laminated structure.

7. An apparatus for fabricating an elongate, multiple ply laminated structure having a variable cross section, comprising in combination:

ply feed means for receiving a multiplicity of elongate plies, said ply feed means including guide means for longitudinally guiding said plies in spaced apart planes;

laminating means for longitudinally pulling said composite of plies from said ply feed means and through said laminating means; and

variable cross section forming means disposed between said feed means and said laminating means and including carrier ply guide means and a plurality of variable ply guide and controller means, said carrier ply guide means disposed to receive at least one of said plies from said feed means and to guide it as a carrier ply along a longitudinal guide path as it is pulled toward said laminating means by said puller means, said plurality of variable ply guide and controller means disposed to individually receive a plurality of other said plies from said feed means and controllably feed variable, discontinuous lengths thereof as variable plies to said longitudinal guide path for forming said longitudinal composite with said carrier ply, each said variable ply guide and controller means including means for selectively transversely severing an associated said ply and means for selectively longitudinally feeding a leading end of a severed ply into said longitudinal guide path of said carrier ply for engagement with the composite of plies therein, said means for severing said plies being spaced at substantially equal transverse distances from said longitudinal guide path of said carrier ply and at predetermined longitudinal intervals along said longitudinal guide path of said carrier ply, means for joint, simultaneous operation of said means for severing said plies, and means for joint, simultaneous operation of said means for longitudinally feeding the leading end of a severed ply into said longitudinal guide path, whereby a laminated composite of said plurality of plies is produced with a variable cross section including a trailing taper of decreasing cross section and a leading taper of increasing cross section wherein the distances between the trailing ends of the plies of the trailing taper and the distances between the leading ends of the plies of the leading taper, respectively, are determined by said longitudinal intervals between said means for severing said plies.

3,992,241

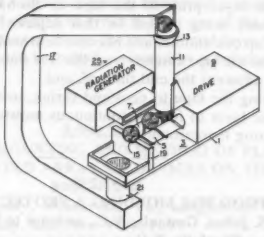
DYNAMIC RESILIENCY OF TENNIS BALLS

Harry Ferrari, 144 W. Swissvale Ave., Pittsburgh, Pa. 15218

Filed May 22, 1975, Ser. No. 579,846

Int. Cl.[2] A63B *39/00;* **B32B** *27/16;* **B01J** *1/10*

U.S. Cl. 156—272 **4 Claims**



1. The method of improving the dynamic resilience of a tennis ball comprising the steps of

a. forming the inner core of a tennis ball of an elastomeric rubber,

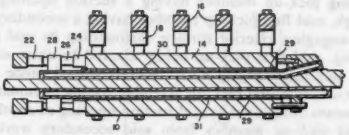
b. irradiating said core with from 10^5 to 10^{10} rads of radiation so as to promote predominant cross linking of the molecules of the rubber and to increase its dynamic resilience, and

c. securing a cover to said core.

3,992,242
SELF-FEEDING PRESS FOR PRODUCING STRIP MATERIAL

Robert A. Caughey, Clinton Road, Antrim, N.H. 03102

Division of Ser. No. 499,935, Aug. 23, 1974, Pat. No. 3,905,290. This application Mar. 24, 1975, Ser. No. 561,648
Int. Cl.² B31F *5/00*
U.S. Cl. 156—289 **12 Claims**

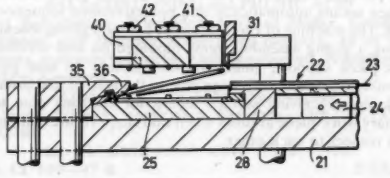


1. A method of compacting and integrating material to form a composite structure comprising, delivering the material of which the composite is to be formed onto a support, applying pressure to the material perpendicularly to the exposed surface of the material resting on the support by means of a plurality of narrow elongate bars arranged longitudinally of the support, while holding the bars pressed against the exposed surface of the material, moving them one by one along the exposed surface of the material a predetermined distance without moving the material in that direction until all of the bars have been moved a predetermined distance and then retracting all of the bars simultaneously in the opposite direction said predetermined distance and the material therewith relative to the support to discharge the composite structure from the support.

3,992,243
APPARATUS FOR PRODUCING TRANSPARENCY SLIDE UNITS

Rolf Uno Berggren, Gotene, and Erik Gustav Birger Blom, Mariestad, both of Sweden, assignors to Sven Goran Pettersson, Oberageri, Switzerland

Division of Ser. No. 387,550, Aug. 13, 1973, Pat. No. 3,878,632. This application Nov. 26, 1974, Ser. No. 527,384
Claims priority, application Sweden, Aug. 17, 1972, 7310704
Int. Cl.² B29C *27/02;* **B32B** *31/16*
U.S. Cl. 156—521 **6 Claims**



1. An apparatus for making complete and permanently closed transparency slide units for use in projectors and viewers by mounting film transparencies severed in succession from film strips in individual, prepared and substantially square frame sets, each of which comprise a pair of separate but juxtaposed, substantially rectangular frame halves that each have an offset opening therein, a width that is equal to that of the completed unit and a length that is considerably smaller than that of the completed unit, which frame halves are adapted to receive and retain the transparency between them when they are in a position, one above the other, in which their openings coincide but the two frame halves themselves overlap each other only partly in their direction of length so as to present oppositely located free end marginal portions, the two frame halves of each prepared set being held in such partly overlapping position by means of rivetable studs protruding from the lower frame half and extending loosely through corresponding apertures in the upper frame half, said apparatus comprising:

a. a first guide track for a transparency film strip;

b. means for advancing the film strip stepwise along said first track;

c. a cutting device at the end of said first track and operative to sever from the passing film strip one transparency of a given length at the time;

d. a second guide track extending across the end of said first track for guiding prepared frame sets in side-by-side relationship from an inlet area of said second track into an opening position in front of the end of said first track and then further on to an outlet area of said second track, the first track connecting to one side of said second track;

e. means for supplying to the inlet area of said second track prepared frame sets of the type defined lying in a position in which each set has the free end marginal portion of its upper frame half remote from that side of said second track to which said first track connects;

f. means for advancing the frame sets thus supplied stepwise along said second track to place one by one of them in said opening position in front of the end of said first track;

g. said second track having along a portion of its length and at that longitudinal side thereof to which said first track connects, a cantilever-like flange extending inwardly over the track to entirely cover the free end marginal portion of the lower frame half of each frame set when the latter is received in said opening position, said flange having, at least within the length thereof covered by the width of the film strip, a top surface over which said film strip will pass when leaving the end of said first track, and a free edge forming a counter for a cutting tool included in said cutting device;

h. said second track having further, within an area opposite to but remote from said free counterforming edge, a bottom recess, said recess having a length corresponding at least to the width of the frame set when the latter is received in said opening position, and a width measured across said second track that is at least slightly less than the difference in length between the upper frame half and the entire frame set;

i. a vertically movable pressure shoe above said recess and operative to temporarily force the free end marginal portion of the upper frame half of each frame set received in said opening position downwrdly and partly into said recess to thereby temporarily separate the two frame halves by canting and lifting the upper one while leaving the lower one substantially intact; and

j. also above said second track and separate from said shoe, a vertically movable device including means serving as tools for permanently uniting the two frame halves of each frame set together by riveting the studs of the lower frame half when the related transparency has been inserted between the two separated frame halves, severed from the film strip and properly retained by again closing together the two frame halves.

3,992,244
TAPE APPLICATING AND SEVERING ASSEMBLY

Alan J. Craig, Oakdale; James H. Casey, Roseville, and Richard P. de Neui, Lake Elmo, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 4, 1975, Ser. No. 583,772
Int. Cl.² B32B *31/00*
U.S. Cl. 156—521 **10 Claims**

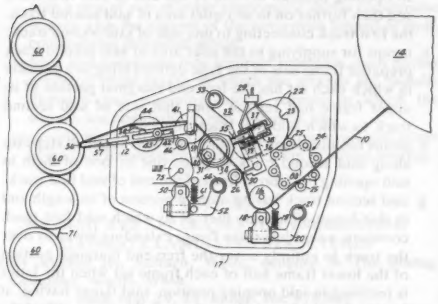
1. An apparatus for cutting and applying a thin strip of double-coated, pressure-sensitive adhesive tape to a substrate comprising:

a frame;

a means for supporting a supply of convolutely wound double-coated adhesive tape on said frame, said tape being disposed on a release liner;

severing means for cutting said tape across its width to form strips and not sever the liner so said tape strips remain on said liner after cutting;

an applicating arm having an applicating tip and an opposite end, said opposite end being mounted on a driven eccentric rotated on said frame about an axis perpendicular to an axis of said arm extending between said tip and said opposite end for movement of said opposite end about a circular path and said arm longitudinally, said applicating



tip having a surface extending parallel to the axis of rotation of said opposite end for supporting a strip of tape;

means associated with said tip applicating arm intermediate said tip and said opposite end for oscillating said applicating arm about said eccentric resulting in said applicating tip moving through a thin-foil shaped biconvex path at a rate momentarily equaling the speed of the substrate;

means for advancing said tape and said liner off a said supply past said severing means and applicating tip of said applicating arm; and

indexing means for registering a severed strip of tape at the applicating tip of the applicating arm in position for application to the substrate.

3,992,245

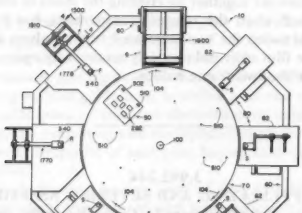
MACHINE FOR DELIVERING SECONDARY WORK-PIECES TO PRIMARY WORK-PIECES

Earl E. Franklin, 3511 Terrace Drive, Omaha, Nebr. 68134

Filed Nov. 19, 1974, Ser. No. 525,187

Int. Cl.² B65C *9/08*

U.S. Cl. 156—571 **24 Claims**



1. A material handling machine for lifting secondary work-pieces from stacks thereof and delivering them to a primary work-piece, said machine comprising a frame, primary and secondary work-piece supports mounted on said frame for movement with respect to each other, a secondary work-piece upholding surface means mounted on said secondary work-piece support and having a first wall assembly thereon at least partially bounding a first stack area and for holding a first vertical stack of said secondary work-pieces in stacked position, a primary work-piece receiving surface means mounted on said primary work-piece support, a secondary work-piece first pick-up assembly mounted on one of said supports, said first pick-up assembly comprising at least a first work-piece-engaging pick-up member having a suction opening therethrough, said first pick-up member having a secondary work-piece-engaging exterior surface surrounding its said suction opening, said first pick-up being adapted to enter said first stack area for engaging a top secondary work-piece on said first stack, said first pick-up assembly having pneumatic conduit means connected to said suction opening at another side of said pick-up member from said secondary work-piece-engaging surface, first controllable pressure reducing means attached to said pneumatic conduit means and reducing the pressure at said suction opening to a lesser pressure than the pressure at the exterior of said first pick-up member whereby when said first pick-up member is in touch with a secondary work-piece the latter is caused to be held by suction against said work-piece-engaging surface of said first pick-up member, said frame having first and second frame sections supporting said primary and secondary work-piece-receiving surface means respectively, a controllable first moving assembly for moving said first pick-up member, said first moving assembly having a transfer portion attached to said first pick-up member and movably mounted on one of said work-piece supports and when activated in a first way moving said first pick-up member from a position above said first stack area to a release location above said primary work-piece receiving area, a first synchronizing control means operably correlated with said first controllable pressure reducing means and causing said lesser pressure to exist when said first pick-up member is above said first stack area and to cease for releasing a secondary work-piece when said first pick-up member is in a certain first release position which latter is above a primary work-piece, said first work-piece support having at least one other secondary work-piece receiving surface means, and a second and similarly describable secondary work-piece pick-up assembly mounted on one of said work-piece supports, means attached to said frame and moving said first and second work-piece supports so that said primary work-piece receiving surface means is moved with respect to said secondary work-piece receiving surface means so as to dispose first one then another of said secondary work-piece receiving surface means in a position adjacent to said primary work-piece receiving surface means automatically in a predetermined sequence.

20. The machine of claim **1** further having a gluing assembly having a gluing assembly frame mounted on said secondary work-piece support, gluing means mounted on said gluing assembly frame and delivering glue to the area of said primary work-piece-receiving surface means for applying glue to a primary work-piece at times when said supports are stationary with respect to each other.

3,992,246

SOLAR EVAPORATOR

Milton C. Welch, P.O. Box 37, Toomsuba, Miss. 39364

Filed Dec. 9, 1974, Ser. No. 531,139

Int. Cl.² B01D *1/00, 1/22, 1/16*

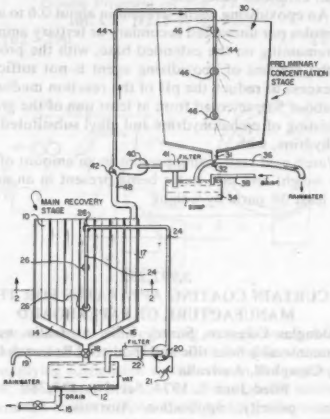
U.S. Cl. 159—1 S **9 Claims**

1. Apparatus for recovering minerals from a solution in water by evaporative concentration of the solution resulting in precipitation of minerals therefrom, comprising:

a. a vat for receiving and containing said solution;

b. a large evaporative surface located adjacent said vat, the surface being dark in color to absorb ambient solar radiation and being inclined downwardly toward the vat with a steepness in the range of **1:6** to **1:10** with respect to the horizontal to provide drainage of the solution thereinto,

and the evaporative surface being corrugated to provide alternate ridges and furrows wherein the furrows drain toward the vat and the ridges slant into the furrows at angles which are steep as compared with the angle at which the evaporative surface is inclined toward the vat, the average slant of the surfaces extending from the ridges to the furrows being between 10° and 30° with respect to horizontal;



c. solution spraying means including piping having spray orifices therein operatively directed to distribute sprayed solution so that it impinges upon and wets most of the corrugated surface; and

d. pump means operative to draw solution from the vat and discharge it into said piping at a rate such that said spraying means maintains the ridges of the corrugated surface sufficiently wet that the solution draining from the ridges toward the furrows entrains and carries with it minerals precipitated on the corrugated surface.

3,992,247

PROCESS FOR THE CONCENTRATION OF DILUTED SALT-CONTAINING SULPHURIC ACID

Kurt Bodenbenner, Wiesbaden; Gerhard Müller, Kelkheim, Taunus, and Heinrich Müller, Neu-Isenburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 17, 1974, Ser. No. 515,660

Claims priority, application Germany, Oct. 20, 1973, 2352701

Int. Cl.² H01B *13/00*; **C01B** *17/84, 17/90*

U.S. Cl. 159—47 R **5 Claims**

1. A process for concentrating and desalting dilute sulphuric acid including two heating steps, which process comprises first heating and concentrating a 10 to 30 % dilute sulfuric acid at a pressure of 50 to 150 mm Hg by indirectly countercurrently contacting said acid with steam at a temperature of 100° to 150° C from a second step, removing water vapor from the heated acid and withdrawing up to about 50% concentrated sulfuric acid, further concentrating the acid in a second heating step by directly countercurrently contacting and heating the concentrated acid with a superheated steam at a temperature of 350° to 450° C, separating steam and additional water vapor from the heated acid, said steam being used in the first heating step, withdrawing acid of a higher and up to about 80% concentration, cooling said acid to crystallize salts therefrom, separating the salts and recovering the more highly concentrated sulfuric acid.

3,992,248

CONTINUOUS FEEDING SYSTEM FOR TREATMENT TOWERS

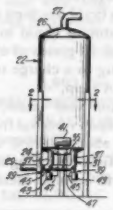
Alfred Max Hurter, Beaconsfield, Canada, assignor to Stadler Hurter Limited, Montreal, Canada

Continuation-in-part of Ser. No. 37,700, May 15, 1970, abandoned. This application Dec. 27, 1971, Ser. No. 212,505

Claims priority, application United Kingdom, May 19, 1969, 25326/69

Int. Cl.² D21C *3/24, 7/06*

U.S. Cl. 162—17 **4 Claims**



4. A method of improving the continuous feeding of material into a treatment tower having a bottom inlet end and a top outlet end, with the bottom inlet end having a plurality of spaced-apart passageways connecting a single material supply line to the tower, comprising feeding material through the supply line to all of the passageways under pressure and substantially opening each of said passageways in timed sequence while substantially closing the other passageways in a manner to allow material to flow selectively into the tower from different locations to minimize channeling while maintaining continuous feed into the tower at a constant rate.

3,992,249

CONTROL OF PULP-PAPER MILL PITCH DEPOSITS

Charles Edward Farley, Stratford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 458,952, April 8, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,230

Int. Cl.² D21C *3/20*

U.S. Cl. 162—72 **7 Claims**

1. A process for inhibiting the deposition of adhesive pitch particles onto the surface of pulp-making equipment, prior to beating, from the water with which a cellulose fiber suspension having a content of said particles is being washed, which comprises, washing said suspension in a pulp washer containing an aqueous solution of an anionic polymer containing at least about 25 mol percent, but not more than about 85 mol percent, of hydrophobic-oleophilic linkages selected from the group comprising styrene, isobutylene, methylstyrene, allyl stearate, octadecyl acrylate, octadecene, dodecene, n-octadecylacrylamide, vinyl stearate and vinyl dodecyl ether and at least about 15 mol percent, but not more than about 75 mol percent, of hydrophilic acid linkages selected from the group comprising acrylic acid, methacrylic acid, maleic acid, itaconic acid, acrylamidoacetic acid, maleamic acid and styrenesulfonic acid, forming a pitch-polymer complex of said particles and said polymer, and removing said complex with the water used to wash said cellulose fiber suspension thereby separating substantially all of the pitch-polymer complex from said cellulose fiber suspension, wherein the amount of said polymer being used is in the range of about 0.5 to 100 parts by weight per million parts by weight of said suspension.

3,992,250

METHOD FOR BLEACHING OF HIGH CONSISTENCY CELLULOSIC PULP

Punya B. Chaudhuri, Norrkoping, and Nils G. Norberg, Karlstad, both of Sweden, assignors to Kamyr A.B., Karlstad, Sweden

Filed Mar. 21, 1975, Ser. No. 560,863

Claims priority, application Sweden, Mar. 21, 1974, 7403806

Int. Cl.² D21C 9/12, 9/14

U.S. Cl. 162—88 **5 Claims**

1. A method of continuously treating vegetable fiber containing raw material comprising the steps of

digesting said raw material to form pulp, washing said pulp,

thickening said pulp so that it has a solids concentration of approximately 30–40 percent,

bleaching said pulp in a first bleaching stage by treating said pulp with a first treatment liquid in a vessel, said liquid having between 3 and 10 grams of chlorine gas dissolved therein, corresponding to a charge of 20 to 80 kilograms of chlorine per ton of pulp,

removing said pulp from said vessel, said pulp after said bleaching first stage upon removal from said vessel having a concentration of about 6–15% solids as a result of dilution during said first bleaching stage, and then

transporting said pulp to another bleaching stage.

3,992,251

PROCESS OF MAKING WET STRENGTH PAPER CONTAINING MONO PRIMARY POLYAMINE AND ORGANIC DIHALIDE MODIFIED, EPOXIDIZED POLYAMIDE

Stanley A. Lipowski, Livingston, N.J., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation of Ser. No. 401,386, Sept. 27, 1973, abandoned, which is a division of Ser. No. 304,729, Nov. 8, 1972, Pat. No. 3,703,279. This application Sept. 25, 1975, Ser. No. 616,858

Int. Cl.² D21H 3/58

U.S. Cl. 162—164 EP **20 Claims**

1. A method of manufacturing paper having increased wet strength comprising adding from about 0.1 to about 5.0 parts by weight of at least one wet strength resin per 100 parts by weight of dry pulp to an aqueous suspension of paper stock, said wet strength resin being in the form of an aqueous resin solution or colloidal suspension comprising:

I. A mixture of a resin which is the reaction product of

A. A member selected from at least one of the group consisting of

a. saturated dicarboxylic acids having 4 to 12 carbon atoms;

b. non-decarboxylating unsaturated dicarboxylic acids having from 5 to 12 carbon atoms;

c. saturated and non-decarboxylating unsaturated tricarboxylic acids having 6 to 10 carbon atoms;

d. C_{1-12} alkyl mono- and di-esters of saturated and unsaturated dicarboxylic acids having 2 to 12 carbon atoms;

e. C_{1-12} alkyl mono- and di-esters of saturated and unsaturated tricarboxylic acids having 6 to 10 carbon atoms; and

f. anhydrides of saturated and unsaturated dicarboxylic acids having 4 or 5 carbon atoms; with

B. At least one backbone polyamine, present in about 0.66 to about 0.99 moles per mole of the member, which may be branched or straight chain, and which contains at least two primary amino groups and at least one secondary or tertiary amino group, with the proviso that if the member has 10 or more carbon atoms, not more than 0.90 moles of the backbone polyamine are present, to form a base polyamide having free carboxylic groups;

C. At least one terminating polyamine, present in an amount at least sufficient to cap all free carboxylic groups remaining on the base polyamide, which may be branched or straight chain, and which contains only one primary amino group and at least one secondary or tertiary amino group, to form a terminated base;

D. A chain extender, present in about equimolar quantities with the terminated base, selected from at least one of the group consisting of alkyldihalide, alkyletherdihalide, phenyl bis-(alkylhalide), and phenylalkyldihalide all containing from one to twelve carbon atoms to form an extended base; and

E. An epoxidizing agent, present in about 0.6 to about 1.5 moles per unreacted secondary or tertiary amino group remaining on the extended base, with the proviso that the amount of epoxidizing agent is not sufficiently in excess to reduce the pH of the reaction medium below about 5.0, selected from at least one of the group consisting of epihalohydrins and alkyl substituted epihalohydrins, with

II. Water, said resin being present in an amount of 70 parts by weight and said water being present in an amount of at least 30 parts by weight.

3,992,252

CURTAIN COATING APPARATUS FOR THE MANUFACTURE OF PAPERBOARD

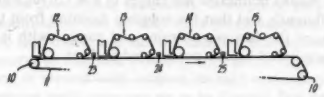
John Douglas Coleman, Surrey Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed June 7, 1974, Ser. No. 477,380

Claims priority, application Australia, June 7, 1973, 3579/73

Int. Cl.² D21H 1/10, 3/00

U.S. Cl. 162—266 **8 Claims**



1. Apparatus for the manufacture of multi-ply paperboard comprising a carrier web, means to drive the carrier web in a forward direction, a first paper pulp depositing device to deposit a layer of paper pulp on the web to form a first ply, at least one additional paper pulp depositing device spaced along the carrier web in the forward direction and operable to deposit a further layer of paper pulp to build a further ply and a starch applicator located in advance of each additional pulp depositing device in the direction of travel of the carrier web to apply starch solution to the ply surface on which each additional pulp depositing device is to deposit a further layer of pulp, each starch applicator comprising a hollow structure defining a chamber to receive starch solution, inlet means for said chamber, means for forcing a starch solution through said inlet into the chamber, a horizontal slot outlet for flow of starch solution from the chamber and a wall portion of said structure which defines an external upright surface extending downwardly from the slot outlet and terminating in a bottom blade edge disposed below said structure such that, in use of the apparatus, starch solution is forced from the chamber through the slot outlet transversely of said wall surface then flows down the wall surface to establish a falling curtain of starch solution which falls away from said wall surface at said blade edge to drop into said ply surface.

3,992,253

PAPERMAKING MACHINE HAVING A SUCTION ZONE FREE OF WIRE SUPPORTS

Christian Schiel, Heidenheim-Schnaitheim, Germany, assignor to J. M. Voith GmbH, Heidenheim (Brenz), Germany

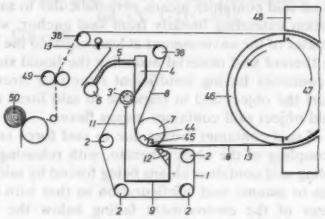
Filed June 12, 1974, Ser. No. 478,739

Claims priority, application Germany, June 20, 1973, 2331313

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] D21F *1/52, 9/02*

U.S. Cl. 162—290 11 Claims



1. A papermaking machine having an endless machine wire and a breast roll about which the wire is entrained and a head box for supplying suspension to the wire in the region of the breast roll; an endless belt and a curved guide means both spaced from the breast roll and about which guide means both of said wire and belt are entrained in engagement with opposite sides of the sheet formed on said wire, said machine having means defining a formation zone between said breast roll and curved guide means wherein water drains through the wire from the suspension supplied to the wire, said formation zone on the side of the wire opposite the suspension side being free of wire supporting members which create pressure pulses in the suspension, said means defining the formation zone including suction box means beneath the wire opposite the suspension side of the wire and extending from the region of said breast roll at least to the region of said guide means, said suction box means including boundary walls at the ends and the sides of the formation zone, at least the side boundary walls terminating laterally at the side edges of the wire and being spaced a short distance downwardly from the wire.

3,992,254

STRUCTURE FOR SEPARATING A WEB AND WIRE IN A PAPER MACHINE

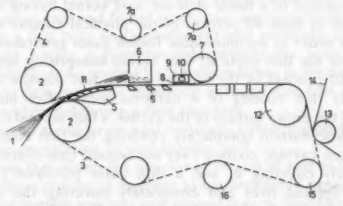
Antti Lehtinen, Jyvaskyla, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed Jan. 7, 1975, Ser. No. 539,252

Claims priority, application Finland, Jan. 8, 1974, 51/74

Int. Cl.[2] D21F *2/00*

U.S. Cl. 162—300 4 Claims



1. In a paper machine, endless wire means on one side of which a web is formed while travelling with said wire means to a separating location where said web and wire means separate from each other and respectively travel beyond said location along different paths, and steam-supply means situated at said location at the side of said wire means opposite from said one side thereof where said web is formed, in close proximity to said opposite side of said wire means for supplying steam to a liquid film at said wire means at said location, said steam-supply means including means for creating in the liquid film steam bubbles which rapidly condense and implode for facilitating separation of the web and wire means from each other, said steam-supply means including a container for containing in its interior steam to be supplied to said wire means, said container having in engagement with said wire means at said opposite side thereof and at said location a foraminous wall through which steam flows from the interior of said container to said wire, said foraminous wall forming said means for creating said steam bubbles.

3,992,255

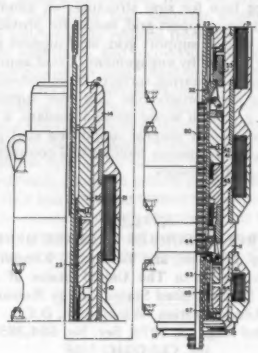
CONTROL ROD DRIVE MECHANISM FOR A NUCLEAR REACTOR

John L. DeWesse, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 18, 1974, Ser. No. 434,722

Int. Cl.[2] G21C *7/08*

U.S. Cl. 176—36 C 8 Claims



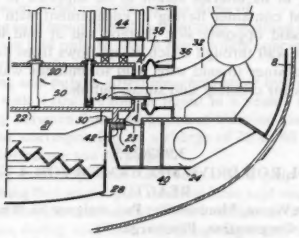
1. Drive apparatus which is mounted to a pressure vessel containing a nuclear core and is adapted to move a drive shaft and an attached control rod into and out of the core in a step-by-step manner including a housing, said drive shaft being disposed for axial movement within said housing, a pair of axially spaced gripper means pivotally mounted within said housing for engaging and disengaging said drive shaft, first electrically energized magnet coil means mounted to said housing for actuating said gripper means and for moving said drive shaft in said step-by-step manner, and locking means for preventing disengagement of said gripper means from said drive shaft upon interruption of electrical power to said first magnet coil means, said locking means including second electrically energized magnet coil means which is electrically independent of said first magnet coil means.

3,992,256

CORE SUPPORT SYSTEM FOR A FAST REACTOR

Jean Lleres, St.-Ismier; Jean-Paul Martin, Ste Genevieve Des Bois; Maurice Perona, Varces Allieres & Risset, and Robert Venot, Fontenay-aux-Roses, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 1, 1974, Ser. No. 510,990
Claims priority, application France, Oct. 9, 1973, 73.36035
Int. Cl.[2] G21C *15/00*
U.S. Cl. 176—40 **6 Claims**



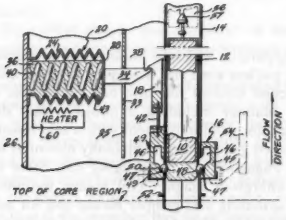
1. In a fast reactor cooled by circulation of liquid sodium and comprising a reactor tank, a diagrid attached to said tank, a hollow cylindrical collector core support grid mounted on said diagrid, spaced parallel bottom and top plates forming said support grid, through-passage columns in said plates for the fuel elements, a plurality of pumps mounted on said diagrid supplying said support grid with liquid sodium coolant, said reactor diagrid including a rigid annular structure, a flat annular bearing face for said structure, an annular bearing surface for said core support grid, means for providing rigidity against flexing of said support grid, said support grid seating on said reactor diagrid by engagement of said annular bearing face on said annular bearing surface, pipes connected to said pumps opening horizontally into said core support grid for supplying said grid with liquid sodium coolant, a framework secured to said reactor diagrid supporting said pipes and a vertically disposed expansion bellows seal connecting each of said pipes to said framework.

3,992,257

NEUTRON-ABSORBER RELEASE DEVICE

Jan B. van Erp, Hinsdale, and Edward L. Kimont, Evergreen Park, Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 13, 1975, Ser. No. 604,385
Int. Cl.[2] G21C *7/08*
U.S. Cl. 176—36 C **9 Claims**



1. A resettable device for supporting an object and for releasing the object with a parameter of an environment at a critical value, comprising:

flexible container means in contact with the environment,

an anchor to which said container means is coupled, and

spring means coupled to said container means for biasing said container means to a configuration extending linearly from said anchor, said container means having within a material whose temperature varies in proportion to the parameter, said material having a melting point corresponding to the critical value of the parameter;

said material occupying a sufficient volume of said container means so that with said material in the solid state and said container means in said configuration, said container means has a specific structural strength sufficient to allow the coupling thereto of the object thereby supporting the object, the object being coupled to said container means in such manner that said object exerts a force on said container means perpendicular to said configuration extending linearly from said anchor, with the parameter of the environment at least equal to the critical value thereof said material assuming the liquid state and said container having insufficient structural strength to support the object and in response to said force exerted by said object said container means flexes;

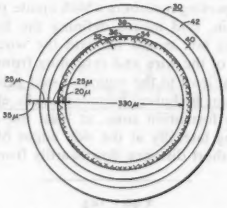
flexing of said container means due to said force releasing the coupling of the object thereto, with releasing of the coupling said container means being forced by said spring means to assume said configuration so that with the parameter of the environment falling below the critical value, said material reassumes the solid state and said container means regains said specific structural strength.

3,992,258

COATED NUCLEAR FUEL PARTICLES AND PROCESS FOR MAKING THE SAME

Joseph M. Tobin, McMurray, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 7, 1974, Ser. No. 431,586
Int. Cl.[2] G21C *3/02*
U.S. Cl. 176—67 **5 Claims**



1. A nuclear fuel particle including a relatively low density kernel of nuclear fuel which results in a fuel element employing such particles which has a substantially higher fissile fuel loading per unit volume of the element which is on the order of 270 to 400 mg of fissionable material per cubic centimeter of the element where such element comprises 40 percent by volume of fuel particles and 25 percent by volume of coolant channel, said particle comprising a kernel comprising a refractory compound of a fissile element, said kernel having a void volume of at least 40 percent of the physical volume of the kernel in order to accommodate fission gases generated during use of the fuel particle, said kernel comprising approximately 20 percent of the volume of the fuel particle a first extremely thin coating of a carbonaceous buffer material covering the entire surface of the kernel, a thin second coating of pyrolytic carbon completely covering the first coating, a thin silicon carbide coating over the second thin coating and completely covering it, and a thin outer pyrolytic carbon coating applied over and completely covering the silicon carbide coating, the this coating being sufficiently gas tight to prevent escape of fission gases generated in the kernel and having a combined strength to resist rupture by the pressure of the fission gases generated during use of the fuel particles

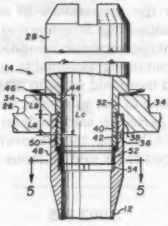
in a nuclear generator, so that even at high reactor temperatures of the order of 1000° C and a burn-up of 50 percent or more FIMA, only a small percentge of the fuel particles exhibit failure of the silicon carbide coatings.

3,992,259

FUEL ASSEMBLY FOR A NUCLEAR REACTOR

Andrew James Anthony, Tariffville, and John Jefferson Hutchinson, Windsor, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed June 25, 1973, Ser. No. 373,207
Int. Cl.² G21C 3/32
U.S. Cl. 176—78 **8 Claims**



1. An improved nuclear fuel assembly of the type having a plurality of elongated fuel elements supported in a generally parallel array by fuel support structures which are rigidly attached to vertically extending hollow structural members at least one of which is in turn connected to upper and lower end fittings, said upper and lower end fittings include upper and lower end plates respectively, and means for alignment of the fuel within a reactor core comprising at least one vertically extending post, adapted to slidably engage corresponding openings in the reactor core structure, extending from the upper and lower end fitting plates, wherein the improvement comprises:

a threaded spindle integral with and extending from said at least one vertically extending post to penetrate an aperture in said end fitting plate, said aperture being defined by a first bore section adjacent said vertically extending post having a diameter substantially the same as said spindle and a second bore section larger in diameter than said first bore, the transition between said first and second bores defining a first shoulder;

a second shoulder on said vertically extending post to limit the penetration of said spindle; and

mating threads on the interior of an end of said at least one hollow structural member to be threadably engaged with said spindle and into said second bore to bear against said first shoulder and secure said means for alignment, said end fitting plate, and said structural member to one another.

3,992,260

METHOD FOR INCREASING YIELD OF SUCROSE

Hideo Suzuki; Harumi Yoshida; Yoshiko Ozawa; Akira Kamibayashi, all of Chiba; Munetaka Sato, Tokyo; Atsushi Mori, and Makoto Endo, both of Hokkaido, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Continuation of Ser. No. 210,555, Dec. 21, 1971, abandoned.
This application May 22, 1974, Ser. No. 472,494
Claims priority, application Japan, Dec. 23, 1970, 45-117011
The portion of the term of this patent subsequent to Oct. 23, 1990, has been disclaimed.
Int. Cl.² C12D 13/02
U.S. Cl. 195—11 **9 Claims**

1. In a method for producing sucrose from beets wherein raw beet juice extracted from beets is purified into beet juice, and the obtained beet juice is concentrated and thereafter converted in sugar-boiling treatments of a sugar-boiling and centrifugal separation process into massecuite which is separated by centrifugal treatments of said sugar-boiling and centrifugal separation process into molasses and sucrose crystals, the improvement which consists essentially of:

adding alpha-galactosidase to act upon beet juice having a concentration of 10° to 60° Brix and withdrawn before said sugar-boiling and centrifugal separation process thereby hydrolyzing raffinose contained in said beet juice into sucrose and galactose, and wherein said beet juice to which the alphagalactosidase is added is the beet juice before a deionization treatment included in the purification process, and the hydrolysate hydrolyzed by the addition of alpha-galactosidase is subjected to said deionization treatment after removing the alpha-galactosidase therefrom;

separating alpha-galactosidase from the hydrolysate thus obtained, subjecting said resultant hydrolysate to the process following the process from which the beet juice has been withdrawn, and recovering sucrose contained in said hydrolysate in said sugar-boiling and centrifugal separation process, wherein by the hydrolysis of raffinose the amount of the raffinose contained in the beet juice is decreased and the amount of sucrose is increased with the result that the sucrose purity in the beet juice is increased, and both the increase of sucrose purity and the decrease of the raffinose cause the growth of sucrose crystals to be accelerated and at the same time cause the sucrose crystals to be normalized with the result that the sucrose is effectively separated in said sugar-boiling and centrifugal separation process and the amount thereof is increased.

3,992,261

METHOD FOR MANUFACTURE OF MALTOSE FROM STARCH BY ENZYMES CO-PRODUCED BY A SINGLE MICROORGANISM

Yoshiyuki Takasaki, and Yoshimasa Takahara, both of Chiba, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jan. 6, 1975, Ser. No. 538,918
Claims priority, application Japan, Jan. 11, 1974, 49-6465
Int. Cl.² C12D 13/02, 13/10; C07G 7/02
U.S. Cl. 195—31 R **9 Claims**

1. A method for the simultaneous manufacture of β-amylase and α-1,6-glucosidase from a microorganism, which comprises:

culturing a microorganism selected from the group consisting of *Bacillus cereus* var. *mycoides* (ATCC No. 31102), *Bacillus* sp. YT 1002 (ATCC No. 31101) and Bacillus sp. YT 1003 (ATCC No. 31103) which belong to the genus Bacillus having the ability to produce β-amylase and α-1,6-glucosidase simultaneously in a culture medium; and

recovering the -amylase and α-1,6-glucosidase from the culture broth.

8. A method for the manufacture of maltose from starch or its derivatives with enzymes by a microoganism, which comprises:

culturing a microoganism selected from the group consisting of *Bacillus cereus* var. *mycoides* (ATCC No. 31102), *Bacillus* sp YT 1002 (ATCC No. 31101) and *Bacillus* sp. YT 1003 (ATCC No. 31103) which belong to genus Bacillus having the ability to produce β-amylase and α-1,6-glucosidase simultaneously in a culture medium; recovering said enzymes thus produced from the culture broth;

adding said enzymes to said starch or its derivatives; and

reating the resultant mixture under conditions such that said enzymes promote the hydrolysis of starch to maltose.

3,992,262

MEDIA CONTAINING MOLASSES AND CORN STEEP LIQUOR FOR PRODUCING GLUCOSE ISOMERASE FROM ACTINOPLANES AND METHOD

Kenneth K. Shieh, St. Louis County, Mo., assignor to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Feb. 10, 1975, Ser. No. 548,537

Int. Cl.² C12D *13/10*; C12B *3/04*

U.S. Cl. 195—66 R **5 Claims**

1. A method of improving glucose isomerase production from Actinoplanes comprising the steps of adding an inoculum of said organism to a fermentor containing molasses in amount sufficient to stimulate the growth of said organism, corn steep liquor from which the sludge thereof has been removed and in amount sufficient to stimulate glucose isomerase production, and an additional source of nitrogen in amount sufficient to increase glucose isomerase production, said additional source of nitrogen being selected from the group consisting of urea and inorganic nitrogen salts, growing said inoculum for a period of time and at a temperature sufficient to produce a desired yield of glucose isomerase, and harvesting the glucose isomerase, said molasses being present in amount of about 1% to about 10%, said corn steep liquor being present in amount of about 0.6% to about 4%, and said additional source of nitrogen being present in amount to provide nitrogen equivalent to that contained in $NaNO_3$ in concentrations of about 0.1% to about 0.6% $NaNO_3$.

3,992,263

PROCESS FOR THE PREPARATION OF MOENOMYCIN

Jürgen Dietrich, Hofheim, Taunus; Miroslav Mracek; Dieter Sukatsch, both of Frankfurt am Main, and Georg Nesemann, Lorsback, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 21, 1975, Ser. No. 597,668

Claims priority, application Germany, July 23, 1974, 2435260

Int. Cl.² C12D *9/14*

U.S. Cl. 195—80 R **1 Claim**

1. In a process for the preparation of Moenomycin by the aerobic fermentation of *Streptomyces ghanaensis* ATCC 14,672; *Streptomyces bambergiensis* ATCC 13,879; *Streptomyces ederensis* ATCC 15,304; *Streptomyces geysiriensis* ATCC 15,303; or their revertants or mutants in a fermentation medium containing a fat, the improvement wherein a surfactant of the formula

$$RO-(CH_2CH_2O-)_nH$$

is additionally present in the fermentation medium, said surfactant being a mixture wherein *n* is 25 and R is 6 to 9 percent octyl, 5 to 7 percent decyl, 48 to 54 percent dodecyl, 18 to 20 percent tetradecyl, 7 to 9 percent hexadecyl, and 8 to 10 percent octadecyl, or being oxethylated dodecyl wherein *n* is 18, 20, or 22.

3,992,264

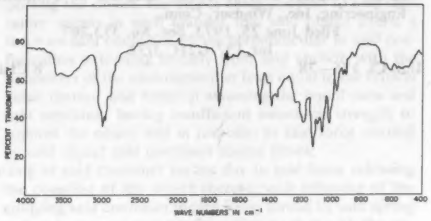
ANTIBIOTIC 1745A/X AND METHODS FOR THE PRODUCTION THEREOF

Richard Wightman Kierstead; Ronald Andrew Le Mahieu, both of North Caldwell, and David Pruess, Passaic, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 438,987, Feb. 2, 1974, Pat. No. 3,928,387. This application July 23, 1975, Ser. No. 598,481

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **1 Claim**



1. A process for the preparation of antibiotic 1745A/X which comprises cultivating *Streptomyces antibiotics* ATCC 11891, under submerged aerobic conditions, in an aqueous nutrient medium containing assimilable sources of carbohydrates, nitrogen and inorganic salts, to which has been added erythronolide A oxime as the substrate, until substantial antibiotic activity is imparted to said medium by the production of antibiotic 1745A/X and the recovering the antibiotic 1745A/X so produced from said aqueous medium.

3,992,265

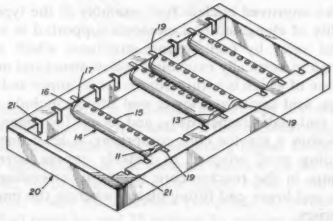
ANTIBIOTIC SUSCEPTIBILITY TESTING

Lloyd Frank Hansen, Campbell Hall, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,581

Int. Cl.² C12K *1/10*

U.S. Cl. 195—127 **6 Claims**



1. An antibiotic susceptability testing cylinder assembly comprising

a transparent solid cylinder of biologically inert plastic having therein, along one cylindrical element, a series of hollow cups radially formed into the plastic of the cylinder, and orienting means at at least one end of the cylinder, and

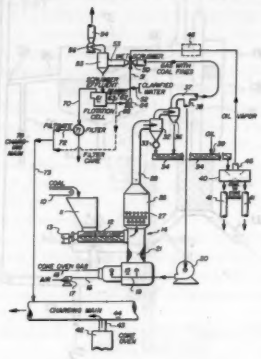
fitting over said cylinder a transparent plastic sleeve, having a series of loading apertures along one cylindrical element, spaced in cup loading configuration for one rotational position of the sleeve, and indexing means to arrest rotation of the sleeve with the loading apertures in loading relationship with the cups in one direction of rotation, and in sealing relationship in the other direction rotation.

3,992,266

RECOVERY OF COAL FINES FROM PREHEATER

Ali I. Aktay, Munster, and Michael O. Holowaty, Crown Point, both of Ind., assignors to Inland Steel Company, Chicago, Ill.

Filed July 24, 1975, Ser. No. 598,843
Int. Cl.[2] C10B 53/04
U.S. Cl. 201—8 9 Claims



1. In a method for charging coal particles into a coke oven, the steps of:

introducing coal into a preheating stage without recycling coal previously removed from said preheating stage;

introducing hot gas into said preheating stage;

preheating and particulizing said coal at said preheating stage;

removing, from said preheating stage, a mixture of coal particles and hot gas;

passing said mixture through a first cyclone separating stage to separate said mixture into a first portion consisting essentially of coal particles and a second portion containing said gas and relatively fine coal particles;

transporting said first portion to a bin containing coal particles for charging into said coke oven;

charging said coal particles from said bin into said coke oven;

passing said second portion through a wet scrubber;

introducing a scrubbing liquid at said wet scrubber;

flocculating said fine coal particles, contained in said second portion, at said wet scrubber;

introducing anti-dusting hydrocarbon liquid onto the coal particles of said first portion, during said transporting step;

venting, from said coal particles, hydrocarbon vapor generated after said hydrocarbon-introducing step and transporting said vented hydrocarbon vapor to said wet scrubber;

introducing said hydrocarbon vapor into said second portion at said wet scrubber to aid in said flocculation of the fine coal particles;

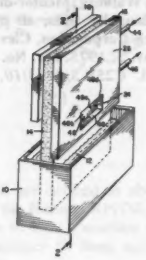
and passing the output from said wet scrubber through a second cyclone separating stage to separate said output into a first part containing said gas and a second part or scrubber effluent containing said flocculated fine coal particles and the liquid from said wet scrubber.

3,992,267

ELECTROCHEMICAL GAS DETECTION METHOD

Harry G. Oswin, Chauncey, and Keith F. Blurton, Ossining, both of N.Y., assignors to Energetics Science, Inc., Elmsford, N.Y.

Continuation of Ser. No. 402,733, Oct. 2, 1973, abandoned, which is a division of Ser. No. 88,267, Nov. 10, 1970, Pat. No. 3,776,832. This application Apr. 21, 1975, Ser. No. 569,851
Int. Cl.[2] G01N 27/46
U.S. Cl. 204—1 T 8 Claims



1. The method of quantitatively detecting a gaseous noxious atmospheric pollutant selected from the group consisting of carbon monoxide, nitric oxide, hydrocarbons, ethanol and methanol in air in an electrochemical cell comprising an anode, a cathode, a reference electrode through which no substantial current flows, said anode being selected from the group consisting of platinum, rhodium, iridium, ruthenium, palladium, osmium, tungsten oxide, tungsten carbide, molybdenum oxide, molybdenum sulfide, and alloys or mixtures thereof, and an aqueous electrolyte in contact with said anode, cathode, and reference electrode including the steps of (1) feeding an air sample containing the noxious gas to be detected to the anode of said cell, said sample being substantially free of other noxious gases; (2) maintaining said anode at a fixed potential of from about 0.9 to 1.5 volts with respect to the reversible hydrogen couple in the electrolyte of said cell relative to said reference electrode to oxidize said noxious gaseous substance and simultaneously insure that current due to oxygen reduction or water oxidation within said electrochemical cell is not discernible relative to the level of current produced by said oxidation of gaseous substance; and (3) measuring the current flowing between said anode and cathode of said cell to quantitatively determine the amount of said gaseous substance to be detected in said gaseous sample.

3,992,268

HYDROCARBON CONVERSION PROCESS

George, Antos, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Nov. 18, 1974, Ser. No. 524,844
Int. Cl.[2] C25B 3/00, 3/10
U.S. Cl. 204—72 9 Claims

1. A process for the preparation of hydrocarbon materials which comprises;

a. reacting waste materials with a microorganism in an aerobic or anaerobic atmosphere at conditions to produce carboxylic acids;

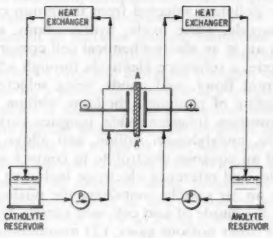
b. electrolyzing the resultant acids in an electrochemical cell at electrolysis conditions to produce hydrocarbon materials and a gas comprising carbon dioxide; and
c. recovering the resultant hydrocarbon materials.

3,992,269

PRODUCTION OF PINACOLS IN A MEMBRANE CELL

Thomas T. Sugano, Painesville; Barry A. Schenker, Mayfield Heights; Joseph A. Walburg, Mentor-on-the-Lake, and Nicholas Shuster, Willoughby Hills, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,390
Int. Cl.[2] C25B *3/04, 3/10, 13/00*
U.S. Cl. 204—77 10 Claims



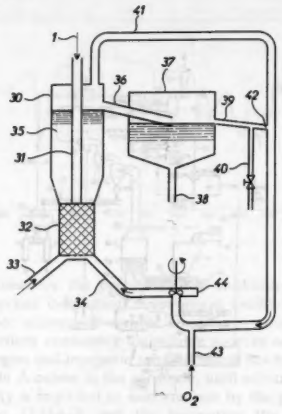
1. A process for the production of pinacol by the electrochemical reduction of acetone, which comprises: introducing aqueous sulfuric acid to the anode compartment of an electrolytic cell divided into anode and cathode compartments by a hydraulically impermeable, cation-exchange membrane, in an amount sufficient to conduct an electrolyzing current; introducing a mixture of aqueous acetone and sulfuric acid to the cathode compartment of said cell such that the initial sulfuric acid concentration is within the range of 150 to 450 grams per liter and the initial acetone concentration is within the range of 200 to 500 grams per liter; introducing copper ions such that the initial copper ion concentration in the cathode compartment is within the range of 1 to 200 ppm; passing a direct, electrolyzing current within the range of 0.5 to 1.5 amperes per sq. inch between the anode and cathode of said cell; and recovering pinacol from the cathode compartment effluent.

3,992,270

METHOD OF RECLAIMING NICKEL VALUES FROM A NICKELIFEROUS ALLOY

Robert Lemarinel, Elancourt; Jean-Michel Demarthe, Viroflay, and Louis Gandon, Rambouillet, all of France, assignors to Imetal, Paris, France

Filed Jan. 29, 1975, Ser. No. 545,223
Claims priority, application France, Feb. 5, 1974, 74.03750
Int. Cl.[2] C25C *5/00*; C22B *23/04*; C25C *1/08*
U.S. Cl. 204—113 16 Claims



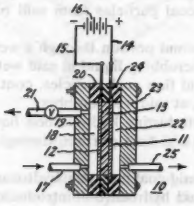
1. A method of reclaiming nickel values from a nickeliferous alloy consisting essentially of nickel and iron and minor amounts of other metals, comprising subjecting the nickeliferous alloy to nitric acid lixiviation and recovering nickel values from the resulting nickel nitrate solution.

3,992,271

METHOD FOR GAS GENERATION

Ivan F. Danzig, North Quincy; Anthony B. La Conti, Lynnfield, and Joseph M. Amore, Danvers, all of Mass., assignors to General Electric Company, Wilmington, Mass.

Continuation of Ser. No. 334,196, Feb. 21, 1973, abandoned, which is a continuation of Ser. No. 112,891, Feb. 5, 1971, abandoned. This application Mar. 3, 1975, Ser. No. 554,428
Int. Cl.[2] C25B *1/04, 11/06*
U.S. Cl. 204—129 4 Claims



1. In an electrolytic method for generating hydrogen and oxygen comprising providing a catalytic cathode, providing a catalytic anode, positioning a cation exchange membrane positioned between and in electrical contact with the cathode and the anode, providing a direct current potential between the cathode and the anode, and generating simultaneously separate supplies of hydrogen and oxygen, the improvement in combination therewith of providing the anode with an

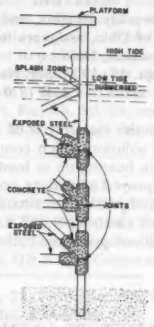
oxygen evolution catalyst consisting of reduced platinum-iridium alloys comprising reduced 5 to 50 weight percent iridium.

3,992,272

SUBMERGED OFFSHORE PLATFORM JOINT PROTECTION

Orwin G. Maxson, and Marvin L. Peterson, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed May 29, 1975, Ser. No. 582,416
Int. Cl.² C23F 13/00; E02D 5/22
U.S. Cl. 204—147 7 Claims



1. A method for protecting submerged steel joint sections of steel support members for offshore platforms comprising: a) prior to immersion placing concrete around the joint sections that will be submerged, said concrete containing pozzolan, the liquid component of the concrete containing up to 50 percent by weight of a polymeric latex and wherein the concrete is applied after cleaning the steel to a white finish, said application being from 0.25 to 1.00 inches thick and wherein the concrete extends from 1 to 2 support member diameters on either side of the covered joint, said concrete in addition containing polymeric reinforcement; b) allowing the concrete to set sufficiently to maintain adhesion to the support member; c) immersing the section having the concrete covered joints; and d) placing sufficient cathodic protection on the support member to inhibit corrosion in sections not covered by concrete.

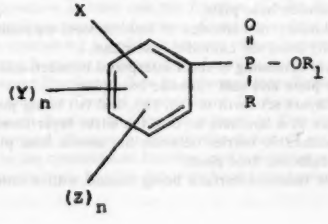
3,992,273

METHOD OF PREPARING SUBSTITUTED PHENYL PHOSPHINIC ACIDS

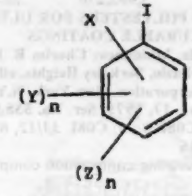
James A. Miles, Olivette, and Mark T. Beeny, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 9, 1975, Ser. No. 620,983
Int. Cl.² B01J 1/10
U.S. Cl. 204—158 R 7 Claims

1. A method for preparing substituted phenyl phosphinic acid esters having the formula



wherein R is selected from the group consisting of primary and secondary alkyl; R_1 is primary alkyl; X, Y and Z are independently selected from the group consisting of hydroxy, halo, trihalomethyl, primary and secondary alkyl, lower alkoxy and thioalkyl; and each *n* is independently zero or one comprising the steps of adding an aryl iodide having the formula



wherein X, Y and Z are defined as above to a lower alkyl phosphonite having the formula $RP(OR_1)_2$ wherein R and R_1 are defined as above to form a reaction mixture and irradiating said reaction mixture to form said substituted phenyl phosphinic acid ester.

3,992,274

SENSITIZED PRODUCTION OF SULFHYDRYL COMPOUNDS USING ULTRA VIOLET RADIATION

Bobby F. Dannels, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,632
Int. Cl.² B01J 1/10
U.S. Cl. 204—158 R 13 Claims

1. In the liquid phase reaction of an allene compound with hydrogen sulfide to prepare a sulfhydryl-terminated product, the improvement which comprises carrying out the reaction at a reaction temperature of about −100° to about 90° Centigrade, a reaction pressure of 0 to 3000 p.s.i.g. and a molar ratio of hydrogen sulfide to the allene compound of about 1:1 to about 20:1 in the presence of ultraviolet light of wavelength substantially above about 2600 Angstroms and a photosensitizing amount in the range of about 0.0005 to about 5% based on the weight of the reaction mixture of an organic photosensitizing reagent for said reaction whereby the speed of the reaction is increased and a substantially colorless product of improved purity is obtained.

3,992,275

LOW GLOSS ULTRAVIOLET CURABLE COATINGS UTILIZING α,α,α-TRICHLOROTOLUENE AS A PHOTOINITIATOR

Iraj K. Shahidi, Florham Park, and Kenneth J. Zeliznak, Elizabeth, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,656
Int. Cl.² C08F 8/00, 2/46, 4/00
U.S. Cl. 204—159.15 8 Claims

1. An ultraviolet curable coating composition capable of producing low gloss coatings when cured by ultraviolet radiation, said coating based on the total weight of the curable

composition, comprising about 40 to about 100 percent of an alpha beta ethylenically unsaturated vinyl polymerizable composition containing at least about two sites of vinyl polymerizable unsaturation, about 60 to about 0 percent, by weight, of another alpha beta ethylenically unsaturated vinyl polymerizable composition containing no more than about one site of vinyl unsaturation, the improvement of which comprises utilizing as a photoinitiator α,α,α, trichlorotoluene.

3,992,276

UNSATURATED POLYESTERS FOR ULTRAVIOLET CURABLE COATINGS

Thomas M. Powanda, Middlesex; Charles B. Rybny, Clifton, and Charles A. DeFazio, Berkeley Heights, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,977

Int. Cl.² C08F *8/00*; C08L *33/12*, *67/06*

U.S. Cl. 204—159.16 **11 Claims**

1. An ultraviolet coating composition comprising the reaction product of:

a. at least about 30 percent, by weight, of a copolymer comprising about 20 to about 97 percent, by weight, based on the total copolymer weight, of an acrylate ester monomer, about 0 to about 73 percent, by weight, on the same basis, of another monomer copolymerizable therewith, about 1 to about 10 percent, by weight, based on the total copolymer weight, of an unsaturated carboxylic acid monomer, and about 2 to about 20 percent, on the same basis, of an hydroxy-containing unsaturated monomer;

b. about 1 to about 10 percent, by weight, based on the reaction product, of a carboxylic acid or anhydride selected from maleic acid, fumaric acid, and maleic anhydride; and

c. about 15 to about 35 percent, by weight, based on the reaction product of a polyhydroxy material;

and about 0.1 to about 10 percent, by weight, based on the total curable composition of an ultraviolet photoinitiator.

3,992,277

PROCESS AND APPARATUS FOR THE MANUFACTURE OF A GAS MIXTURE CONTAINING ACETYLENE, ETHYLENE, METHANE AND HYDROGEN, BY THERMAL CRACKING OF LIQUID HYDROCARBONS

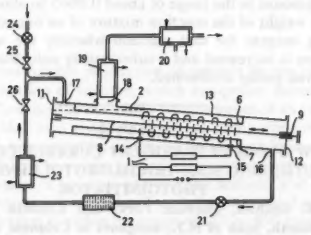
Hans-Georg Trieschmann, Neustadt; Horst Rosewicz; Gerhard Jansen, both of Ludwigshafen, and Dieter Ballweber, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Jan. 14, 1975, Ser. No. 540,849

Claims priority, application Germany, Jan. 22, 1974, 2402844

Int. Cl.² C07C *3/28*, *11/24*

U.S. Cl. 204—172 **5 Claims**



1. A process for the manufacture of a gas mixture containing as major components, acetylene, ethylene, methane and hydrogen which comprises: cracking a liquid hydrocarbon by means of a plurality of arcs burning under the surface of the liquid hydrocarbon, said arcs being produced between stationary electrodes, and limited, in their electrical effect, by the use of chokes or condensers as current-limiting elements, wherein the total energy acting on the system is distributed by an arrangement of the electrical components, which is responsible for the stability of the arcs, over a plurality of localized burning points, the current-limiting elements being matched to the voltage so that the output of each individual arc on average does not exceed 0.7 kW, and wherein voltages of from 3 to 10 kV are used to carry out the process.

3,992,278

ELECTROLYSIS CATHODES HAVING A MELT-SPRAYED COBALT/ZIRCONIUM DIOXIDE COATING

Irving Malkin, University Heights, and James R. Brannan, Painesville, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Sept. 15, 1975, Ser. No. 613,320

Int. Cl.² C25B *11/04*

U.S. Cl. 204—242 **9 Claims**

1. A cathode for the electrolysis of water or an aqueous alkali metal halide solution which comprises an electrically conductive substrate bearing on at least part of its surface a coating of a melt-sprayed admixture consisting essentially of particulate cobalt and particulate zirconia.

7. In a halo-alkali electrolysis cell having a separator the improvement which comprises the cathode of claim **2.**

3,992,279

ELECTRODE ASSEMBLY

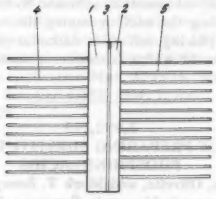
Karl-Georg Larsson, Sundsvall, Sweden, assignor to Kemanord Aktiebolag, Sundsvall, Sweden

Filed Aug. 20, 1974, Ser. No. 498,894

Claims priority, application Sweden, Aug. 20, 1973, 7311325

Int. Cl.² C25B *11/06*, *11/10*

U.S. Cl. 204—288 **2 Claims**



1. An improved electrode assembly comprising

a. an anodic base plate comprising a layer of titanium,

b. a cathodic base plate comprising a layer of iron or steel,

c. a plurality of titanium anodes extending outwardly from the anodic base plate,

d. a plurality of cathodes of iron or steel extending outwardly from the cathodic base plate,

e. a layer consisting of silver interposed between said anodic base plate and said cathodic base plate,

f. the layers set forth in (a), (b), and (e) being joined together in a laminate so that the silver layer forms a H_2-impermeable barrier between the anodic base plate and the cathodic base plate,

the active titanium surface being coated with a conductive metal.

3,992,280

METAL ELECTRODE WITH AN ACTIVE COVER LAYER FOR ELECTROCHEMICAL PURPOSES

Christine Zöllner nee Möller; Dieter Zöllner, both of Schwaig near Nurnberg, and Konrad Koziol, Rothenbach a.d. Pegnitz, all of Germany, assignors to Firma C. Conradty, Nurnberg, Germany

Filed Oct. 22, 1974, Ser. No. 516,951

Claims priority, application Germany, Oct. 31, 1973, 2354477

Int. Cl.[2] C25B *11/06, 1/34, 11/10*

U.S. Cl. 204—290 F 5 Claims

1. In an electrode for use in an electrolytic bath wherein said electrode comprises a basis metal and an active cover layer comprising a compound selected from the group consisting of a metal platinate and a metal palladate, the improvement which comprises an embedding layer between said basis metal and said cover layer, said embedding layer serving to secure said cover layer to said basis metal and said embedding layer comprising a compound having the formula Ba (M_X Ti_{1-X}) O_3 wherein M is at least one element selected from the group consisting of Pt, Ru, Rh, Pd, Os, and Ir, and wherein X is a number between about 0.1 and about 0.5.

3,992,281

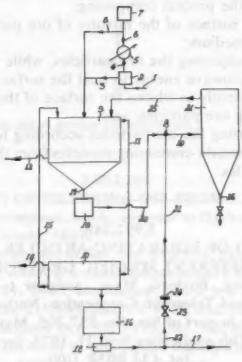
REMOVAL OF SOLID CONTAMINANTS FROM TAR AND TAR-LIKE PRODUCTS

Dirk Christoffel Benade, Sasolburg, South Africa, assignor to South African Coal, Oil & Gas Corporation Limited, Sasolburg, South Africa

Filed Feb. 27, 1975, Ser. No. 553,786

Int. Cl.[2] C10C *1/00*

U.S. Cl. 208—45 5 Claims



1. A method of recovering tar from a coal gasification process, comprising the steps of subjecting to separation a solids-contaminated tar derived from the gasification process and containing coal gas liquor and a tar solvent; separating in said separation at least one tar fraction of said derived tar from a solid contaminant fraction of said derived tar, the latter fraction containing a residual amount of tar; separating said tar solvent from the separated tar fraction; causing the solid contaminant fraction to flow in a stream; introducing the tar solvent into the flow of contaminant fraction; causing the contaminant fraction and the tar solvent to flow together a predetermined distance to permit dissolution of residual tar present in the contaminant fraction; and separating a thus-dissolved residual tar fraction from said solid contaminant fraction.

3,992,282

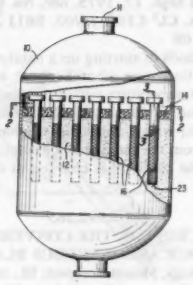
METHOD CONTACTING A BED OF SOLID PARTICLES WITH A STREAM CONTAINING PARTICULATE IMPURITIES

Martin P. Grosboll, Homewood, and Robert R. Edison, Olympia Fields, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 363,703, May 24, 1973, Pat. No. 3,888,633. This application Mar. 26, 1975, Ser. No. 562,084

Int. Cl.[2] B01D *23/02, 37/00, 43/00;* C10G *34/00*

U.S. Cl. 208—46 7 Claims



1. A method for contacting a bed of discrete solid particles with a fluid stream containing particulate impurities, whereby the particulate impurities are filtered by said bed of solid particles, and wherein said bed contains at least one hollow elongated basket member having a flow restricting inlet and having its longitudinal axis aligned with the direction of fluid flow and extending along a substantial portion of its length into said bed of solid particles, said method comprising conveying said fluid stream in a generally downward direction toward the upstream surface of said bed, passing a portion of said fluid stream through said upstream surface and passing a portion through said flow restricting inlet and into the interior of said bed, thereby resulting in a portion of said particulate impurities being filtered by the upstream section of said bed until the pressure drop across said surface exceeds the pressure drop across said inlet, and thereafter at least a portion of said particulate impurities being passed through said inlet and filtered by the interior of said bed, whereby said bed is capable of being contacted by an increased amount of said fluid stream prior to becoming plugged with particulate impurities.

3,992,283

HYDROCRACKING PROCESS FOR THE MAXIMIZATION OF AN IMPROVED VISCOSITY LUBE OIL

LeRoi E. Hutchings, Mount Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 23, 1974, Ser. No. 508,118

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] C10G *41/00, 13/06, 37/02*

U.S. Cl. 208—59 5 Claims

1. A process of hydrocracking lube oil stocks to high viscosity index oils comprising subjecting a lube oil charge stock to hydrocracking conditions selected to minimize the formation of non-lube oil fractions in the presence of a first hydrocracking catalyst, fractionating the resulting hydrocracked lube oil stock to separate therefrom a light lube oil boiling below

about 925° F. and a heavier lube oil boiling above about 925° F., subjecting said heavier lube oil in the presence of a second hydrocracking catalyst to more severe hydrocracking conditions than said charge stock to reduce the viscosity and improve the V.I. characteristics of the heavier lube oil, blending the thus improved heavier lube oil with said light lube oil, and recovering the resultant lube oil blend as the product of the process.

3,992,284

BLACK OIL CONVERSION PROCESS STARTUP AND SHUTDOWN METHODS

Frank Stolfa, Park Ridge, and Michael D. Winfield, Bloomingdale, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Sept. 17, 1975, Ser. No. 614,291
Int. Cl.² C10G *13/00*; B01J *27/04*
U.S. Cl. 208—108 **11 Claims**

1. In the methods of starting up a catalytic black oil hydroprocessing reaction zone wherein there is circulated a light distillate as the temperature within the reaction zone is gradually increased and the black oil is then charged to the reactor, the improvement which comprises flushing the inventory of light distillate from the reactor by circulating a heavy vacuum gas oil before the black oil is charged to the reactor.

3,992,285

PROCESS FOR THE CONVERSION OF HYDROCARBONACEOUS BLACK OIL

LeRoi E. Hutchings, Mount Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 23, 1974, Ser. No. 508,119
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C10G *9/16, 34/00*
U.S. Cl. 208—208 R **4 Claims**

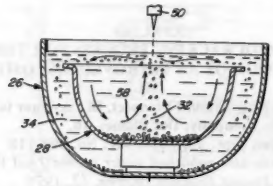
1. A process for the desulfurization of a hydrocarbonaceous black oil containing sulfur and asphaltic material which comprises preheating said oil by indirect heat exchange to a temperature not in excess of about 550°F., commingling with the preheated oil a steam-containing gas in sufficient amount and of sufficient temperature to raise the oil to a desulfurization temperature of from about 600°F. to about 800°F., and contacting the thus heated oil at a hydrocarbon conversion conditions with a desulfurization catalyst.

3,992,286

MINERAL ORE CONCENTRACTOR

Gregory Grosbard, New York, N.Y., and Hugh A. Ghiringhelli, Wilton, Conn., assignors to Eocene Research (Entire), Wilton, Conn.

Filed Apr. 15, 1975, Ser. No. 568,189
Int. Cl.² B03B *1/00*
U.S. Cl. 209—1 **7 Claims**



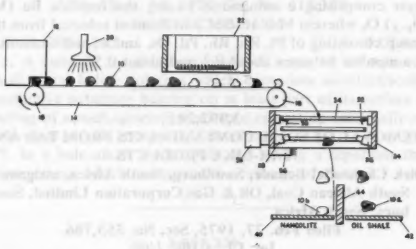
1. Apparatus for treating a mixture of solid materials having surface conductivity and different densities, comprising a container immersed in a body of dielectric medium and having a charge exchange surface on which said solid materials are supported, said solid materials being movable through the body of dielectric medium along paths extending externally of the container, means for applying a non-uniform electric field to said body of dielectric medium to displace said materials along said paths at different rates, and means for confining the body of dielectric medium and collecting solid materials displaced from the container along said paths, said field applying means including an electrode spaced by an air gap from an exposed surface of the body of dielectric medium.

3,992,287

OIL SHALE SORTING

Hugh R. Rhys, 2420 Martin Ave. SE., Grand Rapids, Mich. 49507

Filed Feb. 27, 1975, Ser. No. 553,464
Int. Cl.² B03B *1/02*
U.S. Cl. 209—2 **13 Claims**



1. A process for sorting bicarbonate-containing ore particles from oil-containing ore particles in a mixture of the two ore particles, the process comprising:

treating the surface of the mixture of ore particles with an aqueous medium;

thereafter subjecting the ore particles, while wet, to directional microwave energy to heat the surface of the particles sufficiently to whiten the surface of the bicarbonate-containing ore particles; and

optically sorting the ore particles according to color to sort the bicarbonate-containing particles from the oil-containing particles.

3,992,288

METHOD OF SEPARATING ARTICLES HAVING DIFFERENT SPECIFIC GRAVITIES

Harry C. Kling, Boxford, Mass., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Continuation-in-part of Ser. No. 557,205, March 10, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,309
Int. Cl.² B03B *1/00*
U.S. Cl. 209—3 **10 Claims**

1. A method for separating defective and non-defective semiconductor dice which have different specific gravities, comprising the steps of:

preparing a solution having a specific gravity between the specific gravities of the defective and non-defective dice;

placing said dice in said solution;

subjecting said dice and said solution to ultrasonic pressure waves having an intensity sufficient to establish movement of said dice, whereby the dice having a specific gravity lower than that of the solution migrate to the surface of the solution and the dice having a specific gravity higher than the solution migrate to the bottom; and

removing the dice having the lower specific gravity from the solution while the higher specific gravity dice remain at the bottom.

3,992,289
METHOD FOR PRODUCTION OF SULFHYDRYL COMPOUNDS USING ULTRA-VIOLET RADIATION

Bobby F. Dannels, and Emil J. Geering, both of Grand Island, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,631
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 R **9 Claims**

1. In the liquid phase reaction of an allene compound with hydrogen sulfide to produce a sulfhydryl-terminated hydrocarbon, the improvement which comprises carrying out the reaction at a reaction termperature of about −100° to about 95° Centigrade, a reaction pressure of about 0 to about 3000 p.s.i.g. and a molar ratio of hydrogen-sulfide to the allene compound of about 1:1 to about 20:1 in the presence of ultraviolet light of wavelength substantially above about 2600 Angstroms to obtain a sulfhydryl-terminated hydrocarbon substantially free of color and elemental sulfur.

3,992,290
METHOD FOR COALESCING OIL USING A BROMINATED MONOOLEFIN RESIN

Danny G. Cook, Walnut Creek, Calif., assignor to Liquid Processing Systems, Inc., South San Francisco, Calif., a part interest

Continuation-in-part of Ser. No. 465,169, April 26, 1974, abandoned. This application Oct. 31, 1974, Ser. No. 519,751
Int. Cl.² B01D *17/02*
U.S. Cl. 210—23 R **4 Claims**

1. In a method for coalescing oil from an oil in water liquid dispersion, the step of passing the dispersion through a bed of resin granules to form a coalesced floating layer of oil on the water, said resin comprising a brominated monoolefin polymer in which the repeating units of the polymer chain comprises

wherein R is an alkyl group or hydrogen.

3,992,291
METHOD OF FILTERING OIL FROM LIQUIDS

Gene Hirs, Birmingham, Mich., assignor to Hydromation Filter Company, Livonia, Mich.

Continuation-in-part of Ser. No. 575,104, May 6, 1975, abandoned, which is a continuation-in-part of Ser. No. 418,165, Nov. 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 219,145, Jan. 19, 1972, Pat. No. 3,780,861. This application Oct. 22, 1975, Ser. No. 624,611
The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.
Int. Cl.² B01D *23/24*
U.S. Cl. 210—23 R **9 Claims**

1. A method of removing oily particulate contaminants from contaminated water-based liquid independently of any solid contaminants, comprising the steps of:

flowing oil-contaminated liquid through a deep bed filter of granulated black walnut shells;

coalescing at least a portion of the oily particulates during flow through the deep bed to form larger particles consisting essentially of oil, and capturing the coalesced oil particles in the interstices of the black walnut shell filter bed;

terminating contaminated liquid flow after the filter bed has become at least partially saturated by captured oil contaminants;

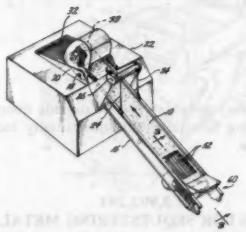
backwashing the mixture of granulated black walnut shells and contaminants by a high velocity liquidous scrubbing to free at least a portion of the captured oily contaminants to rejuvenate the bed; and

reinitiating oil-contaminated liquid flow through the bed of granulated black walnut shells.

3,992,292
MOVING BELT-TYPE OIL SKIMMER WITH PROPULSION INDUCED FLOW, METHOD AND APPARATUS

Eldon L. Grimes, and David W. Lerch, both of Seattle, Wash., assignors to Marine Construction & Design Co., Seattle, Wash.

Filed Oct. 15, 1974, Ser. No. 514,814
Int. Cl.² B01D *15/06*; E02B *15/04*
U.S. Cl. 210—30 A **9 Claims**



1. Oil spill recovery apparatus for removing oil from the surface of a body of water, such apparatus comprising an endless generally flat oil-water separation filter belt means of low-resistance flow-through construction defined by a three-dimensional openwork mesh operable to recover oil without bridging of the mesh openings, and means supporting and guiding the filter belt for motion lengthwise in a predetermined circuit path over a lower guide means, also upper guide means spaced apart from and above the lower guide means defining an inclined path for at least an upper reach portion of said belt, means to drive the belt lengthwise in its circuit path with said upper reach portion travelling upwardly along such inclined path whereby oil picked up by the belt is lifted out of the water and the water drains from the belt, means adjacent the upper guide means acting on the belt to remove oil therefrom, impeller means on the side of the belt adjacent to and generally beneath the upper guide means, and flow channeling means defining a flow channel with said impeller means located therein and constructed and arranged to define an inlet opening communicating with the inclined upper reach portion of said belt, said flow channeling means being substantially in sealing arrangement with the belt thereby defining a closed path for the flow of water drawn through at least said upper reach portion of belt by said impeller means.

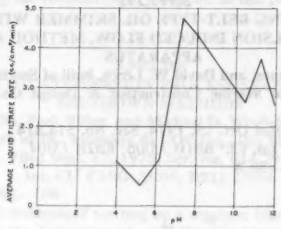
3,992,293
METHOD OF FILTERING LIQUIDS CONTAINING DISSOLVED CARBON DIOXIDE

John E. Sawicki, Milwaukee, and James P. Murdock, New Berlin, both of Wis., assignors to Jos. Schlitz Brewing Company, Milwaukee, Wis.

Filed Mar. 24, 1975, Ser. No. 561,046
Int. Cl.² B01D *37/00*; C02D *1/00*
U.S. Cl. 210—48 **3 Claims**

1. A method of filtering effluent from a brewing process, comprising the steps of collecting residual aqueous effluent from a brewing process, said effluent containing suspended solids, dissolved solids and dissolved carbon dioxide and having a pH less than 5.0, adding a water soluble alkaline material selected from the group consisting of alkali metal hydroxides, ammonium hydroxide and ammonium pyrophosphate, to said collected effluent to increase the pH to the range of 6.5 to 8.0,

said alkaline material reacting with said carbon dioxide to substantially remove the carbon dioxide from solution, and thereafter filtering said collected effluent to remove the suspended solids, the removal of carbon dioxide decreasing foam generation during filtration and substantially increasing the rate of filtration.



3,992,294

PROCESS FOR SEQUESTERING METAL IONS

Daniel J. Scharf, Cheektowaga, and Howard A. Chamberlin, Grand Island, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 7, 1974, Ser. No. 431,194
Int. Cl.² C02B 5/06
U.S. Cl. 210—58 **17 Claims**

1. A process for sequestering metal ions comprising treating said ions with about 0.001 to about 50 percent aqueous solution of a compound of the formula:

wherein R′ is selected from the group consisting of ⁻OH, alkyloxy and aryloxy.

3,992,295

POLLUTED WATER PURIFICATION

E. O. Box, Jr., and Floyd Farha, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 24, 1975, Ser. No. 552,605
Int. Cl.² C02B 1/34
U.S. Cl. 210—63 R **6 Claims**

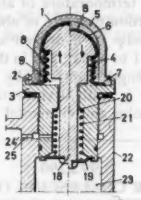
1. A process for the purification of aqueous streams containing organic material impurities dissolved and/or suspended therein to aqueous products substantially free of organic material which comprises contacting an aqueous stream containing oxidizable organic pollutant impurities and an oxygencontaining gas with a copper manganite catalyst consisting essentially of copper, manganese, and oxygen having the formula $Cu_3Mn_2O_6$, $Cu_2Mn_2O_3$, $CuMnO_2$, $CuMn_2O_3$, $CuMn_3O_4$, and $CuMn_2O_4$ in which the atomic ratio of copper to manganese varies from about 0.25:1 to about 4:1 under liquid phase oxidation conditions including a temperature in the range of about 350° F (177° C) to about 550° F (288° C), a liquid hourly space velocity (LHSV) of 0.1 to 10, and a molar ratio of water to oxygen in the range of 10:1 to 200:1 to convert said organic materials to innocuous materials so that said aqueous stream which has been substantially freed of said contaminating impurities can be safely discarded or reused.

3,992,296

DEVICE FOR DETECTING THE CLOGGING OF STRAINER FILTER

Kouji Nobuta, Yokohama, Japan, assignor to Nihon Rokaki, Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 458,997, April 8, 1974, abandoned.
This application June 25, 1975, Ser. No. 590,266
Int. Cl.² B01D 35/14
U.S. Cl. 210—90 **8 Claims**



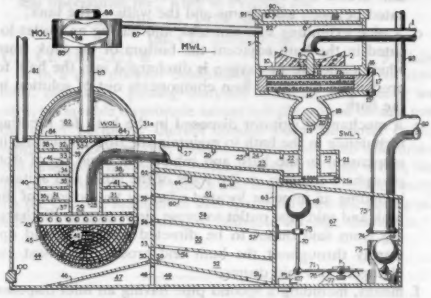
1. A device for indicating as an expression of pressure differential the fluid passing ability of a filter having an inlet, an outlet and a fluid passageway therebetween, said device comprising: a housing adapted for connection to the filter; said housing having a chamber; a dome-shaped transparent member protruding from and closing one end of said chamber; a flexible tubular diaphragm element seated in said chamber and dividing said chamber into an inner chamber portion and an outer chamber portion, said outer chamber portion being adjacent said transparent member; said diaphragm element sealing said inner chamber and said outer chamber portions from each other, whereby said outer chamber portion is isolated from said inner chamber portion; said flexible diaphragm element having sides, a closed end in said inner chamber portion and an open end in said outer chamber portion; said flexible diaphragm element being expandable and contractible, whereby said open end of said diaphragm element can be expanded and contracted to substantially occupy and substantially vacate said outer chamber portion; plunger means mounted in said housing for reciprocal movement between extended and retracted positions and having one end seated against said closed end of said diaphragm in said inner chamber portion, the other end of said plunger means being adapted to respond to a fluid pressure differential between said inlet and said outlet; a spring urging said plunger means toward its retracted position whereby said plunger means is extended in response to a change in fluid pressure differential between said inlet and said outlet; said open end of said diaphragm element when said plunger means is extended occupying the portion of said outer chamber portion adjacent to and seating snugly against the entire curved surface of said transparent member and when said plunger means is retracted being spaced from said curved surface; a colored liquid in said outer chamber portion; said sides of said diaphragm element flexing inwardly into said inner chamber portion as said plunger extends to create a liquid reservoir of said colored liquid displaced from against said curved surface in said outer chamber portion, said diaphragm element and said colored liquid being of contrasting colors whereby said transparent member exhibits one color throughout its curved surface when said open end of said diaphragm element is expanded to occupy that portion of said outer chamber portion adjacent said curved surface and said liquid is confined to said reservoir and a different color when said diaphragm element is contracted and said outer chamber portion between said open end and the curved portion of said transparent member is occupied by said colored liquid.

3,992,297

OIL SEPARATOR DEVICE

Elisha J. Baughcom, Rte. 1, Box 15A, Newington, Ga. 30446, and Daniel C. Lee, Sr., 223 Lawton Ave., Savannah, Ga. 31404

Filed Feb. 18, 1976, Ser. No. 659,109
Int. Cl.² B01D 21/24; B03D 3/00
U.S. Cl. 210—104 20 Claims



1. A device for cleaning water that has been contaminated by oil that is insoluable in water and has a specific gravity lower than water or that has been contaminated by any other similar liquid, comprising,

a riser chamber disposed at a slant,

pumping means for supplying a continuous flow of the contaminated liquid to the bottom of said slanting riser chamber,

said riser chamber having a ceiling,

a plurality of downwardly projecting baffles secured in spaced relation to the ceiling to form pockets for the oil along the ceiling to thus facilitate separation of the liquids of different specific gravities and to dampen out oscillations of the mixed liquids in the riser chamber,

an oil-bath water cleaner, including an oil-filled chamber,

means at the upper end of the riser chamber for delivering, in a continuous flow, the contaminated liquid to the top of the oil-filled chamber, where the oil in the contaminated liquid, having an affinity for the oil already there, combines with the oil in the oil-filled chamber to keep it full, and the excess oil moves down with the water into an intermediate chamber having openings along its top outer side where the oil separates out into an oil chamber, and the water passes down through suitable openings at the bottom of the intermediate chamber into the bottom of the oil chamber,

means for removing oil from the top of the oil chamber, and

means for removing the clean water from the bottom of the oil chamber.

3,992,298

DEWATERING MACHINE

Steven S. Davis, Bountiful, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 588,257, June 19, 1975, which is a continuation of Ser. No. 519,893, Oct. 31, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,129
Int. Cl.² B01D 33/02, 33/36
U.S. Cl. 210—141 6 Claims

1. An integral machine for filtering and dewatering solids from a slurry comprising:

a. a vacuum filter constructed and arranged to filter solids from a slurry;

b. a first endless belt of filter medium trained about said vacuum filter so that vacuum applied by said vacuum filter causes a cake of solids from the slurry to build upon said first endless belt;

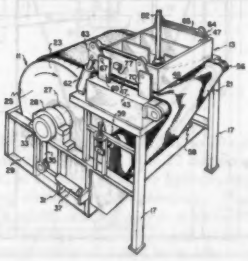
c. an expression device inclusive of:

i. drainage means supported and arranged to present a drainage deck over which said first belt passes;

ii. a plenum chamber structure supported above said drainage means and having an open end which substantially encompasses the area directly above said drainage means;

iii. a flexible impervious diaphragm which is sealingly fixed across said open end of said plenum chamber structure in face-to-face relationship with said drainage deck and spaced apart therefrom in a relaxed position;

iv. a second endless belt of filter medium and means training said second endless belt to encircle said plenum chamber structure and to run beneath said diaphragm parallel to said drainage deck above said first endless belt;



v. pressurizing means in fluid-flow communication with said plenum chamber structure for selectively applying fluid pressure against said diaphragm to urge the same from the relaxed position to a distended position whereat said diaphragm exerts pressure against a cake of solids on a section of said first endless belt overlying said drainage deck to express liquid from said cake of solids; and

d. indexing means operatively connected to said vacuum filter for intermittently indexing said filter medium belt so that said belt carries solids cake from said slurry onto said drainage deck, said pressurizing means and said indexing means being cooperatively operative such that said drum is indexed only when said diaphragm is relaxed and such that said pressurizing means applies pressure against said diaphragm only at such times as said drum is not being indexed.

3,992,299

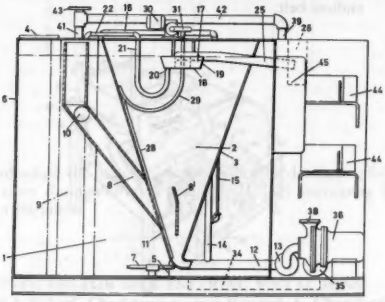
SEWAGE TREATMENT DEVICES PARTICULARLY FOR MARINE APPLICATIONS

Stanley William Wray, Poole, England, assignor to Hamworthy Engineering Limited, Dorset, England

Filed Mar. 6, 1975, Ser. No. 555,803
Claims priority, application United Kingdom, Mar. 27, 1974, 13703/74
Int. Cl.² C02C 1/08
U.S. Cl. 210—152 1 Claim

1. In a sewage treatment apparatus of the activated sludge extended aeration type particularly suited for use aboard ship, said apparatus including a compartment divided into first and second containers, said first container having a top portion and including inlet means, discharge means, flow directing means and aerating means, said second container having a downwardly pointing tapered profile, a top portion and a bottom portion, and including first and second outlet means, said second container being disposed within and with its top portion at the centre of the top portion of said first container, said first directing means being arranged to restrict the flow of sewage around the outside of said second container and, having been aerated by said aerating means, to said discharge means, which communicates with said ..econd container so as

to transfer liquid from said first to said second container, said first outlet means being arranged to remove supernatant liquid from below and near to the working level of liquid in said second container, said second outlet means being connected to the bottom portion of said second container and being arranged to return sludge from said bottom portion to said first container, the improvement consisting of disposing said first outlet means generally at the centre of the top portion of said second container so as to be at the centre of the working level of liquid therein and of forming said first outlet means as a combined surface skimmer and flow control weir, said surface skimmer comprising a tray having sides, a bottom and an outlet and said flow control weir comprising a pipe having an



open end and a curved surface in which is provided a hole and a conduit connected to said hole, said tray sides being disposed just below said liquid working level in said second container so as to collect floating debris and said outlet communicating with said first container so as to return said floating debris thereto, said pipe extending through said bottom of said tray and being disposed with said hole at the same level as said tray sides and with said open end below the middle of said tray so that supernatant liquid from below said tray enters said pipe and overflows through said hole into said conduit for removal from said second container, whereby the effect of movement of the ship on the rate of flow of liquid through said first outlet means is minimized.

3,992,300

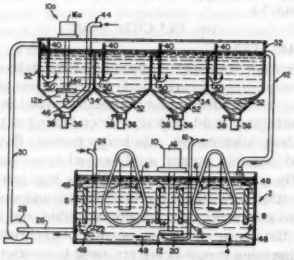
APPARATUS FOR CONTROLLING IRON CONTENT OF A ZINC PHOSPHATING BATH

Edward Alexander Hill, Scotch Plains, N.J., assignor to TRW Inc., Cleveland, Ohio

Division of Ser. No. 292,595, Sept. 27, 1972, Pat. No. 3,874,951. This application Nov. 14, 1974, Ser. No. 523,779

Int. Cl.² B01D *21/00*

U.S. Cl. 210—167 **2 Claims**



1. A closed end immersion-type zinc phosphating apparatus comprising:

a. a work processing tank housing a phosphating bath;

b. a plurality of work holding drums rotatably supported within the tank and at least partially immersed in the bath, said drums being spaced from each other and the walls of the tank;

c. a plurality of heat exchangers disposed in the bath for maintaining the bath at a desired operating temperature, certain of said heat exchangers being located between said drums and other of said heat exchangers being located between said drums and the walls of the tank;

d. a pipe extending into the tank and having an outlet located in the bath adjacent the bottom of the tank from which outlet air or oxygen is discharged into the bath to precipitate dissolved iron components out of solution in the bath;

e. a mechanical agitator disposed in the bath for creating turbulence in the bath to maintain the iron precipitate in suspension in the bath and inhibit the build up of iron phosphate solution on the walls of the tank, said agitator including an impeller located adjacent the bottom of the tank and said pipe outlet to cause air or oxygen discharging from said outlet to be directed outwardly and upwardly throughout the bath and around said heat exchangers and said drums;

f. means, including a second pipe having an inlet disposed adjacent the bottom of the tank and a pump, for conducting bath solution to an auxiliary tank associated with said work processing tank for effecting sedimentation of iron precipitate present in said solution; and

g. means for conducting clarified solution from said auxiliary tanks back into the work processing tank.

3,992,301

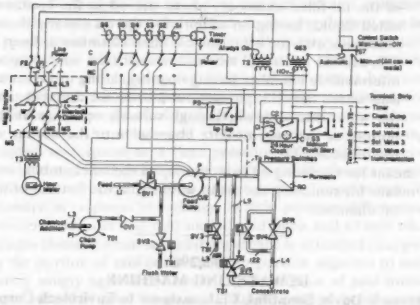
AUTOMATIC FLUSHING SYSTEM FOR MEMBRANE SEPARATION MACHINES SUCH AS REVERSE OSMOSIS MACHINES

Frank R. Shippey, Thousand Oaks; Timothy C. Vance, Los Angeles, and Fred E. Martin, Newbury Park, all of Calif., assignors to Raypak, Inc., Westlake Village, Calif.

Continuation of Ser. No. 417,286, Nov. 19, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,640

Int. Cl.² B01D *31/00, 13/00*

U.S. Cl. 210—23 H **13 Claims**



1. In an apparatus of a type providing at least one module comprising a core member having a semi-permeable membrane on the surface thereof, in a position to be exposed to a feed liquid in a manner whereby the liquid can permeate through the membrane producing flows of permeate and concentrate, means for directing a feed liquid from a source thereof to said membrane under pressure, a source of flush liquid separate from said feed liquid and a source of air for cleaning purposes, control means for causing interruption of circulation of feed liquid through the apparatus and for initiating a cleaning cycle, the control means including means for releasing the pressure in the module and for causing flow therethrough of said flush liquid for cleaning, the control means haing means to initiate the flow of flushing liquid and for injection of air from said source under pressure in the

flushing liquid for a timed interval whereby the air expands in the liquid creating turbulence, serving to clean the surface of the membrane.

3,992,302

DIALYZER BAFFLE

Kyu Ho Lee, Norristown, Pa., assignor to Extracorporeal Medical Specialities Inc., King of Prussia, Pa.

Filed Aug. 28, 1975, Ser. No. 608,444
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 B 5 Claims

1. In a coil dialyzer comprising an outer casing an inner core, means for passing dialysate between said casing and core, permeable membrane tubing spirally wound on said core the outer periphery thereof spaced from the outer casing, support material spirally wound on said core with said tubing and extending beyond the outer periphery of said tubing into the space between said tubing and the casing, a baffle overlying the support material in said space between the casing and tubing to prevent shunting of dialysate through this space.

3,992,303

METAL COLD FORMING PROCESS AND LUBRICANT COMPOSITION THEREFOR

George E. Barker, Evanston; Stephen C. Cohen, Highland Park, both of Ill.; John L. O'Brien, Winchester, and Jack Milgrom, Concord, both of Mass., assignors to Van Straaten Chemical Company, Chicago, Ill.

Continuation-in-part of Ser. No. 466,643, May 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 372,125, June 21, 1973, abandoned. This application Jan. 22, 1976, Ser. No. 651,318
Int. Cl.² C10M *3/18*
U.S. Cl. 252—37 6 Claims

1. A liquid coating composition for forming a lubricant film on a ferrous metal workpiece, useful for cold extrusion of the same, said composition comprising:

a. an inert carrier vehicle selected from the group consisting of water and organic solvents;

b. a chlorine-containing polymer which is film-forming at room temperatures selected from the group consisting of polymers and copolymers of vinyl chloride, vinylidene chloride ad epichlorohydrin and chlorinated polyolefin polymers which are relatively non-corrosive to steel, said liquid composition having a chlorine content in bound polymeric form of from 1.5 to 30% by weight (wet basis); and

c. a destabilizing agent selected from the group consisting of salts of the transition metals, tin and aluminum, and water soluble free radical catalysts selected from the group consisting of peroxides, peresters and hydroperoxides, said destabilizing agent being present in an amount of from 0.25 to 10% based on polymer solids.

3,992,304

SOFTENING AGENT FOR A WOVEN FABRIC

Yutaka Minegishi, Saitama, and Haruhiko Arai, Narashino, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

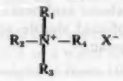
Filed Sept. 25, 1975, Ser. No. 616,620
Claims priority, application Japan, Feb. 10, 1975, 50-17127
Int. Cl.² C11C *1/00*; C11D *1/62*; D06M *13/46*
U.S. Cl. 252—8.8 4 Claims

1. A liquid softening agent for a woven fabric essentially consisting of

1. a cationic polyamide compound (A) which is prepared by the steps of reacting 1 mol of diethylene triamine or dipropylene triamine with about 2 mols of a fatty acid of 12 to 24 carbon atoms to thereby form a condensate of an acid value of not greater than 10; adding about 1 to 2 mols of epichlorohydrin to the condensate; subjecting the resulting adduct to the ring-opening polymerization in the presence of an alkali agent; and thereafter neutralizing the polymer thus formed with an acid;

and

2. a quaternary ammonium salt (B) expressed by the following general formula



wherein

each of R_1 and R_2 is an alkyl group of 12 to 20 carbon atoms or a β-hydroxyalkyl group of 14 to 22 carbon atoms; each of R_3 and R_4 is an alkyl group or hydroxyalkyl group of 1 to 3 carbon atoms, a benzyl group or $-(C_2H_4O)_nH$ (n = 1, 2, or 3); and X is a halogen or a monoalkyl sulfuric acid group having an alkyl group of 1 to 3 carbon atoms;

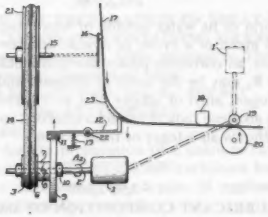
whereby the weight ratio of said (A) to (B) is from about 0.05 to about 5, and the total of said (A) and (B) is about 3 to 15% by weight.

3,992,305

SHUTTLE SPEED CONTROL DEVICE

Yukio Katahira, Tokorozawa, Japan, assignor to Nihon Beru-Haueru Kabushiki Kaisha (Bell and Howell Japan, Ltd.), Higashimurayama, Japan

Filed Oct. 28, 1975, Ser. No. 625,964
Claims priority, application Japan, Nov. 22, 1974, 49-134917
Int. Cl.² G03B *31/00*
U.S. Cl. 352—14 3 Claims



1. A shuttle speed control device for a sound motion picture camera including a drive motor having an output shaft driving a shuttle for transporting film intermittently through an exposure station and a capstan for transporting film constantly through a sound station, and a film loop sensor arranged between the exposure station and the sound station, the control device comprising:

a first half pulley fixed to said motor output shaft;
a second half pulley coupled to said first half pulley and adjustable along said motor output shaft;
transmission means arranged about said half pulleys and coupled to said shuttle for powering said shuttle;
a brake disk rotatably supported on said output shaft;
a first pawl member arranged on said second half pulley;
a second pawl member arranged on said brake disk for engagement with said first pawl member;
a brake member on said film loop sensor movable responsive to variations in the size of the film loop whereby an increase in film loop size causes said brake member to engage said brake disc to increase the rate of operation of said shuttle relative to the rate of rotation of said capstan, and decrease of said film loop size causes said brake member to release said brake disk to decrease the rate of operation of said shuttle relative to the rate of rotation of said capstan.

3,992,306

METAL-WORKING AND CORROSION PROTECTION AGENT

Helmut Diery, Paris, France; Horst Frohlich, Liederbach, Taunus, Germany; Rainer Helwerth, Frankfurt am Main, Germany, and Horst Lorke, Oberliederbach, Taunus, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

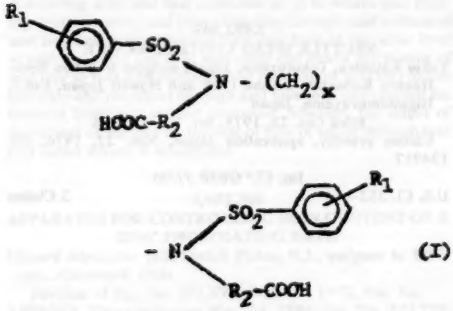
Filed June 12, 1974, Ser. No. 478,525

Claims priority, application Germany, June 18, 1973, 2330978

Int. Cl.² C10M 1/54

U.S. Cl. 252—33.6 **3 Claims**

1. An aqueous metal working solution characterized by 0.1 to 2 percent by weight content of a bis-sulfonamidocarboxylic acid of the formula I



(I)

in the form of its water soluble or water dispersible salt with an alkali metal or a cyclic or acyclic alkylamine or alkanolamine base, as corrosion protection and metal-working agent, wherein R_1 may be the same or different and denotes hydrogen, halogen, alkyl or alkoxy of 1 to 3 carbon atoms, R_2 denotes an alkylene radical having a total of 1 to 5 carbon atoms, and x denotes an integer of from 2 to 6.

3,992,307

LUBRICANT COMPOSITION OF IMPROVED ANTIOXIDANT PROPERTIES

Bruce W. Hotten, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 4, 1974, Ser. No. 520,820

Int. Cl.² C10M 1/48

U.S. Cl. 252—46.7 **11 Claims**

1. In a composition of matter of improved antioxidant properties comprising a major amount of (1) an oil of lubricating viscosity, and (2) an oil-soluble antioxidant selected from (i) sterically hindered phenolic compounds wherein the sterically hindering groups are alkyl groups, said sterically hindered phenolic compounds having from 10 to 40 carbon atoms, (ii) aromatic amine compounds having from 12 to 40 carbons and from 1 to 3 amine nitrogens, (iii) sulfurized organic compounds containing 3 to 40 weight percent sulfur present as thio or polythio linkages or mixtures thereof, and (iv) mixtures thereof, the improvement comprising adding thereto (3) a bisphosphoramide prepared by reacting (a) phosphorus oxychloride, (b) a hydrocarbyl polyamine having from 2 to 7 amine nitrogens and from 2 to 20 carbons and having at least 1 primary amino group, and (c) a hydrocarbyl monoamine having from 2 to 40 carbons, wherein the molar ratio of monoamine and polyamine to molar part of phosphorus oxychloride is from 1 to 3 molar parts of monoamine and 0.4 to 0.6 molar parts of polyamine per molar part of phosphorus oxychloride, the ratio of said anti-oxidant to said bisphosphoramide being from 0.1 to 20:1.

11. In a composition of matter of improved antioxidant properties comprising from 0 to 45 weight percent of (1) an oil of lubricating viscosity, and (2) from 10 to 90 weight percent of an oil-soluble antioxidant selected from (i) sterically hindered phenolic compounds wherein the sterically hindering groups are alkyl groups, said sterically hindered phenolic compounds having from 10 to 40 carbon atoms, (ii) aromatic amine compounds having from 12 to 40 carbons and from 1 to 3 amine nitrogens, (iii) sulfurized organic compounds containing 3 to 40 weight percent sulfur present as thio or polythio linkages or mixtures thereof, and (iv) mixtures thereof, the improvement comprising adding thereto (3) from 5 to 50 weight percent of a bisphosphoramide prepared by reacting (a) phosphorus oxychloride, (b) a hydrocarbyl polyamine having from 2 to 7 amine nitrogens and from 2 to 20 carbons and having at least 1 primary amino group, and (c) a hydrocarbyl monoamine having from 2 to 40 carbons, wherein the molar ratio of monoamine and polyamine to molar part of phosphorus oxychloride is from 1 to 3 molar parts of monoamine and 0.4 to 0.6 molar parts of polyamine per molar part of phosphorus oxychoride, the ratio of said anti-oxidant to said bisphosphoramide being 0.1 to 20:1.

3,992,308

LUBRICATING OIL COMPOSITION CONTAINING SULFURIZED REACTION PRODUCT OF MIXED TERTIARY ALKYL PHENOLS WITH FORMALDEHYDE

Robert E. Malec, Birmingham, Mich., and Larry Plonsker, Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 398,644, Sept. 19, 1973, Pat. No. 3,883,501. This application Feb. 3, 1975, Ser. No. 546,767

Int. Cl.² C10M 1/38

U.S. Cl. 252—48.2 **10 Claims**

1. A lubricating composition containing a major amount of lubricating oil and an antioxidant amount of a sulfurized product made by the process comprising initially forming about 100 parts by weight of a reaction product by reacting at a temperature of about 50°–200°C in the presence of an alkali metal hydroxide catalyst (i) one mole part of a mixture of different alkylphenols, said mixture containing at least 50 weight percent, 2,6-di-tert-alkylphenol and 5–30 weight percent 2-tert-alkylphenol, any balance of said mixture consisting essentially of 2,4-di-tert-alkylphenol and 2,4,6-tri-tert-alkylphenol, said tert-alkyl groups containing 4–12 carbon atoms, and (ii) from about 0.3 to about 10 mole parts of formaldehyde per equivalent of said alkylphenols, and then heating said reaction product with about 0.5–10 parts by weight of elemental sulfur at a temperature of about 50°–200°C.

3,992,309

TRIARYL PHOSPHATE ESTER FUNCTIONAL FLUIDS

Harry Dounchis, Trenton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 490,767, July 20, 1974, Pat. No. 3,931,023. This application Apr. 3, 1975, Ser. No. 564,847

Int. Cl.[2] C10M *1/10, 3/02, 5/02, 7/02*

U.S. Cl. 252—49.8 15 Claims

1. Functional fluid compositions comprising, as the base stock, 95 to 99.99% by weight of a mixed liquid tertiary-butylphenyl/phenyl phosphate containing from about 15 to 60% by weight mono-t-butylphenyl radicals, and in admixture with the base stock about .01 to 5% by weight of a lubricant additive.

3,992,310

COPOLYMERS

Eric Simon Forbes, Lightwater, and Ian Grieg Meldrum, Little Sandhurst near Camberley, both of England, assignors to The British Petroleum Company Limited, London, England

Division of Ser. No. 305,228, Nov. 10, 1972, Pat. No. 3,894,119. This application Mar. 26, 1975, Ser. No. 562,149

Claims priority, application United Kingdom, Nov. 16, 1971, 53079/71

Int. Cl.[2] C10M *1/16*

U.S. Cl. 252—59 4 Claims

1. A lubricating oil composition consisting essentially of a lubricating mineral oil having dissolved therein a viscosity index improving amount of a graft copolymer of polystyrene and polyisobutylene which copolymer consists essentially of 85 to 40% weight of a polystyrene of weight average molecular weight 50,000 to 500,000 and 15 to 60% weight of a polyisobutylene of molecular weight 2,500 to 20,000, the said graft copolymer being in the form of a polystyrene back-bone having each polyisobutylene group attached thereto and prepared by reacting polystyrene and polyisobutylene.

3,992,311

REACTIVE DEVELOPER FOR ELECTROPHOTOGRAPHY

Kenneth A. Metcalfe, 1 Corona Ave., Lockleys, South Australia, Australia (5032), and Alwin S. Clements, 35 Alexander St., Largs Bay, South Australia, Australia (5016)

Continuation of Ser. No. 357,515, May 4, 1973, abandoned. This application July 24, 1975, Ser. No. 598,982

Claims priority, application Australia, May 15, 1972, 8949/72

Int. Cl.[2] G03G *9/12*

U.S. Cl. 252—62.1 R 7 Claims

1. A method for making a developer for electrophotography of the type comprising an insulating carrier liquid having insulative developer particles suspended therein capable of being moved in an electrical field by said field, said method comprising reactively producing the developer particles by placing into a carrier liquid having an electrical resistivity in excess of 10^{10}ohm. centimeter, at least two substances both soluble in the said carrier liquid and both being insulators relative to the carrier liquid and selected so that they do not reduce the electrical resistivity of the carrier liquid when dissolved therein, said substances being so selected to form, when in a dissolved state in the carrier liquid, precipitated developer particles, said substances being selected in quantity such that by reaction therebetween there is no significant surplus of either substance after reaction in the carrier liquid, and maintaining the developer particles in said carrier liquid to be shielded against oxidation by said carrier liquid until used as a developer, said carrier liquid being a hydrocarbon liquid, and said insulating substances each being respectively selected from one of the following groups consisting of:

a. quinalizarin, quinhydrone, hydroquinone, chloranil, vanillin, naphthalene, citral, cinnamaldehyde and diphenylamine, and

b. nitroso β-naphthol, tetralin, cupferron, diphenyl thio carbazone, sym-diphenyl, carbazide, alizarin, and the sodium salt of tetra-acetic acid

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3,992,312

NON-INFLAMMABLE HYDRAULIC FLUID

Fumihide Genjida; Motohiko Ii, and Toyoaki Nasuno, all of Kyoto, Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Aug. 5, 1975, Ser. No. 601,998

Claims priority, application Japan, Aug. 6, 1974, 49-90368

Int. Cl.[2] C10M *3/30*

U.S. Cl. 252—77 12 Claims

1. A non-inflammable hydraulic fluid of a water-glycol base which comprises 5–30% of a water soluble polymer having an average molecular weight of from 10,000 – 200,000 wherein said polymer contains a polyamide residue having active hydrogen atoms which residue is bonded to oxyalkylene groups comprising at least 2 moles of oxyethylene groups and at least 2 moles of other oxyalkylene groups, 30–60% of water and 15–60% of a glycol.

3,992,313

ACID INHIBITOR COMPOSITION AND PROCESS IN HYDROFLUORIC ACID CHEMICAL CLEANING

James Douglas Anderson, Ambler; Edgar S. Hayman, Jr., Doylestown, and Edward A. Rodzewich, Flourtown, all of Pa., assignors to Amchem Products, Inc., Ambler, Pa.

Filed July 14, 1975, Ser. No. 595,974

Int. Cl.[2] C23G *1/06, 1/08*

U.S. Cl. 252—149 18 Claims

1. A process for inhibiting acid attack of a ferrous metal surface comprising contacting the ferrous metal surface with an acidic aqueous solution consisting essentially of a hydrofluoric acid cleaning solution and an inhibitor composition comprising:

a. a Mannich base which is a reaction product of an amine compound having at least one active hydrogen attached to the nitrogen atom, an alpha ketone and formaldehyde prepared in the presence of a strong acid; and

b. thiourea.

3,992,314

PROCESS FOR THE PREPARATION OF SPRAY-DRIED CALCIUM CARBONATE-CONTAINING GRANULES

Steven D. Cherney, Springdale, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 27, 1974, Ser. No. 509,863

Int. Cl.[2] C11D *7/12*

U.S. Cl. 252—160 14 Claims

1. A process for the preparation of a calcium carbonate-containing granule wherein the calcium carbonate has a high effective surface area and a low degree of agglomeration, consisting essentially of the steps of:

a. mixing a member selected from the group consisting of water-soluble alkali metal carbonates, bicarbonates, and sesquicarbonates and mixtures thereof, water, and submicron calcium carbonate particles wherein the weight ratio of the alkali metal salt to the calcium carbonate is from about 1:2 to about 75:1 to form an aqueous slurry, said slurry being substantially free of the watersoluble salts of silicates, phosphates and anionic surfactants; and,

b. spray drying the slurry of step (a) to form the calcium carbonate-containing granule.

3,992,315

RECOVERY OF SURFACE ACTIVE GLYCOSIDES

Douglas N. Dibb, Salisbury, Rhodesia, and John B. Barbour, Tanga, Tanzania, assignors to Omni Research Incorporated, San German, P.R.

Filed Aug. 20, 1974, Ser. No. 499,069

Claims priority, application United Kingdom, Aug. 21, 1973, 39619/73

Int. Cl.[2] B01J *13/00*; C07J *17/00*

U.S. Cl. 252—182 6 Claims

1. A process for concentrating and recovering water soluble steroidal glycosides of plant materials from an aqueous mixture containing the glycosides in solution which comprises foaming the aqueous mixture with an insoluble gas which will not react chemically with the aqueous mixture, separating out the foam from the mixture, the glycoside content of the mixture being concentrated in the foam and thereafter hydrolyzing the glycoside so recovered.

3,992,316

ORGANIC POLYISOCYANATE SOLUTIONS ADAPTED FOR USE IN LAQUER

Josef Pedain, Cologne; Marianne Dislich, Homberg-Meiersberg; Günter Oertel, and Hans-Jürgen Muller, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 481,419, June 20, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 607,079

Claims priority, application Germany, June 27, 1973, 2332567; Mar. 26, 1974, 2414391

Int. Cl.[2] C08G *18/10*; C07C *119/045*

U.S. Cl. 252—182 7 Claims

1. A process for the preparation of physiologically harmless solutions of polyisocyanates in lacquer solvents which comprises mixing and reacting polyhydroxyl compounds of the general formula

$$R(OH)_n$$

in which R represents an *n*-valent aliphatic hydrocarbon group containing 2 to 14 carbon atoms or an *n*-valent cycloaliphatic hydrocarbon group containing 5 to 15 carbon atoms and *n* represents 2 or 3 with 1-isocyanato-3,3,5-trimethyl-5-isocyanatomethyl-cyclohexane in an NCO/OH ratio of between about 3:1 and about 20:1, removing the excess unreacted 1-isocyanato-3,3,5-trimethyl-5-isocyanatomethyl-cyclohexane in the mixture in a two-stage operation in which the major proportion of unreacted excess diisocyanate is first removed by distillation and the resulting distillation residue which still contains 1 to 5 percent by weight of unreacted 1-isocyanato-3,3,5-trimethyl-5-isocyanato-methyl-cyclohexane is dissolved in approximately 0.1 to 20 times its weight of lacquer solvent, mixing the resulting solution at 0° to 120° C with 0.5 to 10 times molar quantity, based on the quantity of unreacted 1-isocyanato-3,3,5-trimethyl-5-isocyanatomethyl-cyclohexane still present, of an alcohol of the formula R'OH in which R' represents an aliphatic hydrocarbon group containing 3 to 12 carbon atoms.

3,992,317

PARTICULATE PEROXYGEN COMPOUNDS

Jean Brichard, Vilvoorde, and Jean-Claude Colery, Brussels, both of Belgium, assignors to Interox, Brussels, Belgium

Filed Jan. 25, 1974, Ser. No. 436,679

Claims priority, application Luxemburg, Jan. 29, 1973, 66925

Int. Cl.[2] C11D *7/54*; B01J *13/02*

U.S. Cl. 252—186 12 Claims

1. A stabilized particulate peroxygen compound consisting essentially of particles of a alkali metal persalt coated with a copolymer of vinylidene chloride and another copolymerisable monomer.

3,992,318

CORROSION INHIBITOR

Raymond H. Gaupp, Whitehouse Station, and John A. Nygren, Jr., Parsippany, both of N.J., assignors to Drew Chemical Corporation, Parsippany, N.J.

Filed Oct. 9, 1973, Ser. No. 404,256

Int. Cl.[2] C23F *11/16*; C02B *5/06*

U.S. Cl. 252—389 A 10 Claims

1. A corrosion inhibiting composition comprising:

a. at least one water soluble phosphonic acid or salt thereof, selected from the group consisting of ethane-1-hydroxy-1, 1-diphosphonic acid, and amino tri(methylene phosphonic acid);

b. at least one water soluble phosphate selected from the group consisting of sodium hexametaphosphate and tetrapotassium pyrophosphate;

c. at least one water soluble acrylic acid polymer, said components (a), (b) and (c) being present in an amount effective to inhibit corrosion in aqueous systems.

3,992,319

INSPECTION PENETRANT PROCESS USING SOLVENCY-INHIBITED REMOVER COMPOSITION

James R. Alburger, 5007 Hillard Ave., La Canada, Calif. 91011

Continuation-in-part of Ser. No. 327,559, Jan. 29, 1973, abandoned. This application May 14, 1975, Ser. No. 577,323

Int. Cl.[2] G01N *21/16*

U.S. Cl. 252—408 2 Claims

1. In a solvent-remover inspection penetrant process in which a solvent-soluble, water-insoluble dyed liquid penetrant is applied to test parts, surface penetrant is removed by applying a solvent remover to said parts, and said parts are inspected for residual entrapments of penetrant liquid in surface flaws, the improvement wherein said solvent remover consists essentially of the following formulation, stated in weight percentages:

Glycol	15%	to	100%
Water	zero	to	85%
Solvent-coupler	zero	to	75%
Wetting agent	zero	to	20%

said glycol being at least one member selected from the group consisting of

Ethylene glycol,
Diethylene glycol,
Triethylene glycol,
Tetraethylene glycol,
Propylene glycol,
Dipropylene glycol,
Hexylene glycol,
1,5-Pentanediol,
Glycerin,
1,2,6-Hexanetriol,
Polyethylene glycol (Mol. wt. — 200 to 1000), and
Polypropylene glycol (Mol. wt. — 200 to 450).

2. In a solvent-remover inspection penetrant process in which a solvent-soluble, water-insoluble dyed penetrant liquid is applied to test parts, surface penetrant is removed by applying a solvent remover to said parts, and said parts are inspected for residual entrapments of penetrant liquid in surface flaws, the improvement wherein said solvent remover consists essentially of the following formulation, stated in weight percentages:

Solvent-coupler	5%	to	75%
Water	25%	to	95%

said solvent-coupler being at least one member selected from the group consisting of

Methanol,
Ethanol,
Butanol,
Isopropanol,
1-Propanol,
2-Butanol,
Ethylene glycol monomethyl ether,
Ethylene glycol monoethyl ether,
Ethylene glycol monobutyl ether,
Ethylene glycol dibutyl ether,
Diethylene glycol monomethyl ether,
Diethylene glycol monoethyl ether,
Diethylene glycol monobutyl ether,
Diethylene glycol dibutyl ether,
Butoxytriglycol,
Methoxytriglycol,
Ethoxytriglycol, and,
1-Butoxyethoxy-2-propanol.

3,992,320
MANUFACTURE OF A MODIFIED TITANIUM COMPONENT FOR CATALYSTS OF THE ZIEGLER-NATTA TYPE

Paul Schneider, Ludwigshafen; Hans Schick, Mannheim; Heinz Mueller-Tamm, and Peter Hennenberger, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 21, 1975, Ser. No. 606,441

Claims priority, application Germany, Aug. 24, 1974, 2441651

Int. Cl.² C08F *4/16*

U.S. Cl. 252—429 B **1 Claim**

1. A process for the manufacture of a modified titanium-containing component of a catalyst for the polymerization of α-monoolefins of 3 to 6 carbon atoms by the Ziegler-Natta method, in which

a. a titanium-containing compound of the general formula

$$TiCl_3 \cdot nAlCl_3$$

wherein n is a number from 0 to 0.7 and
b. a phosphorus-containing compound of the general formula

$$O_mPX_3$$

wherein m is 0 or 1, X is R, OR or NR_2 and R is alkyl, aryl, alkaryl or aralkyl of not more than 24 carbon atoms, in a molar ratio (a):(b) of from 1:0.1 to 1:1, are ground dry, at a grinding acceleration of from 30 to 80 $m.sec^{-2}$, in a vibratory ball mill, wherein

1. a mill of useful volume from 2 to 200 liters is used,
2. the mill is first charged with from 0.1 to 120 kg of the titanium-containing compound (a),
3. thereafter an amount of the phosphorus-containing compound (b) which corresponds to the desired molar ratio is added over a period of from 2 to 100 hours, continuously or in small portions, whilst grinding at a material temperature of from −50° to −5° C,
4. the material is then brought to a temperature of from 5° to 60° C, over a period of from 0.1 to 5 hours, whilst continuing the grinding, and is kept at about these temperatures over a period of from 1 to 100 hours,
5. from 1 to 10,000 per cent by weight — based on the titanium-containing compound (a) — of a finely particulate 1-alkene polymer having a particle size of from 1 to 10,000 μ, a glass transition temperature of from −100° to 60° C and an intrinsic viscosity [η] (measured in decalin at 135° C) of from 0.1 to 20, is then added to the material, and finally
6. the material is kept at a temperature of from −50° to −5° C, over a period of from 1 to 30 minutes, whilst continuing the grinding.

3,992,321
ALUMINA BASED CATALYSTS AND PROCESS FOR PREPARING SUCH CATALYSTS

Hugo Johannes Van Thillo, Grimbergen; René Odon Lammers, Brussels; Henri Robert Debus, Meise; Raymond Marc Cahen, Brussels, and Jacques Maurice Jules Ghislain André, Brussels, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

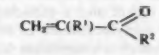
Filed Feb. 10, 1975, Ser. No. 548,212

Claims priority, application Luxemburg, Feb. 18, 1974, 69403

Int. Cl.² B01J *37/00*

U.S. Cl. 252—429 R **12 Claims**

1. A process for preparing spheroidal catalyst particles having an alumina support, which comprises polymerizing, under thermal polymerization conditions or under catalytic polymerization conditions employing free radical catalyst techniques, in a substantially water-immiscible, hot fluid medium, an aqueous mixture which comprises 5% to 30% by weight of alumina hydrogel, 0.15 to 35% by weight of a compound capable of generating an active catalytic agent by thermal or chemical treatment and 0.25 to 20% by weight of a water soluble monomer whose uncross-linked polymer is water soluble or forms a gel, said monomer being one selected from the group consisting of acrylic compounds of the general formula:



wherein R^1 is H or a methyl radical and R^2 is a $-OR^3$ or $-NR^3R^4$ radical in which R^3 and R^4 are H or a hydrophilic radical, said aqueous mixture being dispersed in the form of droplets into the hot fluid medium wherein substantial polymerization of said monomer is performed.

6. The process of claim 1 wherein said aqueous mixture contains from 0.5 to 10% by weight of perchloric acid.

3,992,322
PREPARATION OF POLYMERIZATION CATALYST SYSTEMS

Robert A. Dombro; George E. Illingworth, both of Arlington Heights, and Richard A. Fronczak, Mount Prospect, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 11, 1975, Ser. No. 567,208

The portion of the term of this patent subsequent to June 10, 1992, has been disclaimed.

Int. Cl.² C08F *4/66, 4/68, 4/62*

U.S. Cl. 252—429 B **11 Claims**

1. In the preparation of a polymerization catalyst system wherein a metal alkyl, metal alkyl halide or metal hydride of a Group IA, IIA or IIIA metal and a Lewis Base modifier selected from the group consisting of hydrocarbyl phosphines, hydrocarbyl phosphine oxides, hydrocarbyl amines, hydrocarbyl amine oxides, hydrocarbyl arsines, hydrocarbyl arsine oxides, hydrocarbyl thioethers, hydrocarbyl oxyethers, and hydrocarbyl sufoxides are added to a halide of a Group IVB, VB or VIB metal supported on an oxide of a metal of Group IIA, IIB, IIIA or IVA while maintaining the compounds in an inert atmosphere, the improvement which consists in prehalid-

ing said Group IIA, IIB, IIIA or IVA metal oxide before admixture with said Group IVB, VB or VIB metal halide with a halogenating agent comprising a halide of aluminum, silicon or phosphorus, or posthaliding said admixture with an additional amount of a halogenating agent comprising a halide of a metal of Group IVB, VB or VIB, said halogenating agent and metal halide possessing the same halide moiety, by contact at a temperature of from about 20° to about 400° C. with said halogenating agent in an amount sufficient to insure that the halide to Group IVB, VB or VIB metal atomic ratio is greater than 10:1.

3,992,323
OLEFIN POLYMERIZATION CATALYST

Jin Sun Yoo, South Holland, and Henry Erickson, Park Forest, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Continuation of Ser. No. 344,969, March 26, 1973, abandoned, which is a division of Ser. No. 821,134, May 1, 1969, Pat. No. 3,755,490. This application Sept. 16, 1974, Ser. No. 506,643

Int. Cl.² B01J *31/04, 31/14, 31/18, 31/24*

U.S. Cl. 252—430 **21 Claims**

1. A catalyst comprising a complex consisting essentially of

A. a nickel source selected from the group consisting of alkoxy nickel, dialkoxy nickel carboxylate, a nickel chelate of a β-diketone, a nickel salt of a saturated monocarboxylic acid, a nickel salt of an unsaturated monocarboxylic acid, a nickel salt of a saturated dicarboxylic acid and a nickel salt of unsaturated dicarboxylic acid;

B. an electron donor ligand of mono and di-tri-hydrocarbon substituted elements of Group VA of the periodic table selected from the group consisting of a monotertiary phosphine, a ditertiary phosphine, a monotertiary arsine, a ditertiary arsine, a monotertiary stibine, a ditertiary stibine, a monotertiary bismuthine and a ditertiary bismuthine;

C. A nonprotonic Lewis acid capable of forming a coordination bond with nickel and a reducing agent capable of reducing nickel acetylacetonate to an oxidation state of less than 2 and which is compatible with the nonprotonic Lewis acid on a solid state silica-based support, said catalyst containing a minor amount of nickel represented by (a) sufficient to enhance the olefin polymerization activity of said catalyst, said catalyst containing a mole ratio of (B) to (A) of about 1.0 to 20:1, a mole ratio of (C) to (A) of at least about 3:1, said components (C) and (A) being combined to reduce nickel, represented by (A), to an oxidation state of less than 2, provided that component (C) is in excess of component (B) and that components (A), (B) and (C) are present in a mole ratio which provide a solid black amorphous complex and an effective oligomerization catalyst.

3,992,324
PROCESS FOR THE PREPARATION OF CATALYSTS FOR THE HYDROTREATMENT OF PETROLEUM FRACTIONS

Jacques Maurice Jules Ghislain André; Raymond Marc Cahen, both of Brussels; Henri Robert Debus, Meise; René Odon Lammers, Brussels, and Hugo Johannes Van Thillo, Grimbergen, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed Feb. 10, 1975, Ser. No. 548,199

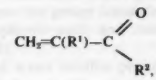
Claims priority, application Luxemburg, Feb. 18, 1974, 69.410

Int. Cl.² B01J *27/04, 21/04, 21/08, 23/84*

U.S. Cl. 252—439 **11 Claims**

1. A process for producing catalysts to hydrotreat petroleum fractions, said catalysts containing, after thermal treatment, an oxide or a sulphide of a Group VIII metal and an oxide or a sulphide of a Group VI B metal and a support consisting essentially of alumina, said process comprising

preparing said catalyst in the form of beads by agglomeration of alumina by polymerizing in a hot and substantially water-immiscible fluid medium, an aqueous mixture which consists essentially of about 5–30% by weight of alumina hydrogel and alumina hydrosol based on alumina and about 0.25–20% by weight of a water-soluble acrylic monomer which is polymerizable to an uncrossed-linked water-soluble polymer or an uncrossed-linked gel polymer, said acrylic monomer being of the formula



wherein R^1 is selected from a group consisting of -H and $-CH_3$ and R^2 is selected from the group consisting of $-OR^3$ and $-NR^3R^4$, wherein R^3 and R^4 are selected from the group consisting of -H and a hydrophylic radical;

dispersing said aqueous mixture in the form of droplets into said fluid medium to effect polymerization of the monomer;

recovering the polymerized beads dispersed in said fluid medium; and

subjecting said beads to drying and calcining thermal treatment; wherein said oxide or sulphide is introduced into said beads prior to said thermal treatment.

3,992,325
λ-CrOOH FLUORINATION CATALYSTS

Joachim Friedrich Knaak, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 25, 1975, Ser. No. 616,835

Int. Cl.² B01J *27/06;* **C07C** *17/00, 19/08*

U.S. Cl. 252—442 **8 Claims**

1. A catalyst comprising an intimate mixture of γ-CrOOH and about from 5% to 50% by weight of at least one non-alkaline metal fluoride selected from thorium tetrafluoride (ThF_4), aluminum trifluoride (AlF_3), calcium fluoride (CaF_2), magnesium fluoride (MgF_2), titanium tetrafluoride (TiF_4), cerium tetrafluoride (CeF_4), yttrium trifluoride cYF_3), strontium fluoride (SrF_2), barium fluoride (BaF_2), ferric fluoride (FeF_3) and zinc fluoride (ZnF_2).

3,992,326
FUSED SALT COMPLEX OF ALUMINUM HALIDE AND MANGANOUS HALIDE DEPOSITED ON A CARRIER

Herbert L. Benson, Jr., Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed July 3, 1975, Ser. No. 593,336

Int. Cl.² B01J *27/10*

U.S. Cl. 252—442 **15 Claims**

1. A solid, particulate catalytic composition for hydrocarbon conversion reactions which comprises a fused salt complex of an aluminum halide selected from the class consisting of aluminum chloride, aluminum bromide and mixtures thereof and a manganous halide selected from the class consisting of manganous chloride, manganous bromide and mixtures thereof present on the surfaces of a porous, refractory inorganic oxide carrier; said solid catalytic composition being formed by heating a composite mixture of the halide salt components of the fused salt complex to a temperature above the melting point of the composite, depositing the melted composite on the carrier surfaces and cooling of the carrier containing the melted composite to a temperature below the melting point of the fused salt complex.

3,992,327

CATALYSTS AND ADSORBENTS HAVING HIGH SURFACE AREA TO WEIGHT

Leon Y. Sadler, III, and William J. Hatcher, Jr., both of Tuscaloosa, Ala., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 11, 1974, Ser. No. 522,829
Int. Cl.[2] B01J *21/08, 29/00*
U.S. Cl. 252—449 **4 Claims**

1. A method for imparting catalytic activity and adsorption capacity to a crystalline silica which comprises subjecting said crystalline silica to attrition grinding for a time sufficient to produce a surface area of at least $30m^2/g$.

3,992,328

PROCESS FOR THE PREPARATION OF AMMONIA SYNTHESIS CATALYST AND CATALYST PREPARED BY THE PROCESS

Morgan C. Sze, Upper Montclair, and Ruey H. Wang, Parsippany, both of N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Filed Oct. 10, 1975, Ser. No. 621,272
Claims priority, application United Kingdom, Oct. 30, 1974, 47061/74
Int. Cl.[2] B01J *21/04, 23/10*
U.S. Cl. 252—459 **14 Claims**

1. In the process of preparing an ammonia synthesis catalyst based on iron oxide, fused and reduced with hydrogen or a mixture of hydrogen and nitrogen, which comprises fusing and reducing the iron oxide, the improvement comprising evacuating air from the pores of the fused and reduced catalyst, impregnating under vacuum the reduced iron oxide with an aqueous solution of a cerium salt, and removing the excess amount of the aqueous solution by drying or draining off.

3,992,329

SUPPORT OF ALUMINA-MAGNESIA FOR THE ADSORPTION OF GLUCOSE ISOMERASE ENZYMES

David L. Eaton, and Ralph A. Messing, both of Horseheads, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 507,209, Sept. 18, 1974. This application Feb. 9, 1976, Ser. No. 656,360
Int. Cl.[2] B01J *21/04*
U.S. Cl. 252—463 **5 Claims**

1. A high surface area, porous, inorganic support material for the adsorption of glucose isomerase enzymes and consisting of a plurality of porous particles having an average particle size between about 4 and 200 mesh, U.S. Standard Sieve, the individual particles each having an average pore diameter between about 100 A to about 1000 A, and consisting of between about 0.84 to 12.0% MgO and 99.16% to 88.0% Al_2O_3, on a weight basis.

3,992,330

FABRICATING BODIES

Michael Lesney Noakes; Wilfred George Caesar, both of Reading, and Henry Lloyd, Wantage, all of England, assignors to United Kingdom Atomic Energy Authority, England

Filed Oct. 29, 1974, Ser. No. 519,008
Claims priority, application United Kingdom, Nov. 8, 1973, 51977/73
Int. Cl.[2] B01J *21/04, 35/02*
U.S. Cl. 252—466 J **9 Claims**

1. A method of manufacturing a body having channels extending through it, comprising the steps of working a single strip of aluminium bearing ferritic steel to provide corrugations the crests and valleys of which extend in a direction across the strip, and folding the strip about one or more axes which lie at an angle to the crests of the corrugations to form layers each having the crests of the corrugations angled to, and lying across the crest of the corrugations of an adjacent layer or adjacent layers, and forming an oxide layer on the surface of the steel by oxidation of the steel.

3,992,331

CATALYTIC PLATINUM METAL PARTICLES ON A SUBSTRATE AND METHOD OF PREPARING THE CATALYST

Henry G. Petrow, Watertown, and Robert J. Allen, Saugus, both of Mass., assignors to Prototech Company, Newton, Mass.

Continuation-in-part of Ser. No. 430,190, Dec. 28, 1973, which is a continuation of Ser. No. 153,824, June 16, 1971, abandoned. This application Dec. 20, 1974, Ser. No. 535,031
Int. Cl.[2] B01J *23/42*
U.S. Cl. 252—472 **7 Claims**

1. In a method of preparing a catalytic structure suitable for high-temperature operation, the steps of applying a complex platinum sulfite acid having the empirical formula $H_3Pt(SO_3)_2OH$ to a substrate, thermally decomposing said applied acid in air, and reducing the decomposed acid to form platinum metal particles having an average particle size of the order of substantially 15–25 Angstroms.

3,992,332

LIQUID COMPOSITION FOR FABRIC TREATMENT

Hemson Joseph Zenon, 2123 N. 68th, Hillsdale, Mo. 63121

Filed Aug. 22, 1974, Ser. No. 499,513
Int. Cl.[2] C11D *1/83;* **D06M** *7/00, 13/40*
U.S. Cl. 252—548 **3 Claims**

1. A water soluble composition for treating fabrics including at least 1% by weight of a water soluble silicone glycol copolymer of nonionic series selected from the group consisting of polyoxyethylene polymethylsiloxane, polyethylene polyoxypropylene polymethylsiloxane and polyoxyethylene polyoxypropylene polymethylsiloxane, at least 5% by weight of a fiber coupling and anti-static agent including a phosphate derivative of anionic series selected from the group consisting of alkyl phosphate esters, and at least 70% by weight of water.

2. The composition as defined in claim 1 wherein the weight of ingredients additionally consists of at least 0.5% detergent from the group consisting of coconut fatty acid alkanolanide.

3,992,333

HIGHLY ABSORBENT COPOLYMERS AND FOAMED ARTICLES HAVING REWETTABILITY MADE THEREFROM

William D. Emmons, Huntingdon Valley; Vincent J. Moser, Hatboro; John G. Brodnyan, Langhorne, and Norman Shachat, Levittown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 134,904, April 16, 1971, Pat. No. 3,705,053. This application June 27, 1972, Ser. No. 266,784
Int. Cl.[2] C08J *9/30*
U.S. Cl. 260—2.5 R **4 Claims**

1. As an article of manufacture an absorbent and readily wettable spone-like mass comprising a copolymer of

a. 0.2 to 10% by weight of at least one α,β- monoethylenically unsaturated monomer containing an amino group in which the nitrogen atom is attached to a carbon atom of a 1,3,5-triazine ring, a carboxylamide group, or a ureido group, the nitrogen atom of such amino, carboxylamido, or ureido group being substituted by a methylol or methoxymethyl group,

b. 0.2 to 15% by weight of at least one α,β-monoethylenically unsaturated monomer, in acid or salt form, having a sulfur-containing acid group and containing no basic nitrogen atom, and

c. the balance to make 100% by weight, of at least one other α,β-monoethylenically monomer which contains no basic nitrogen atom.

3,992,334

METHOD FOR ADHESION OF STEEL CORD TO RUBBER USING N-(SUBSTITUTED OXYMETHYL) MELAMINES AND DIMETHYLOL UREA

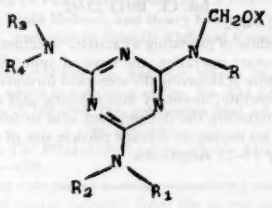
Sidney F. Harvey, Somerset, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 9, 1974, Ser. No. 496,246

Int. Cl.[2] C08L *27/00, 61/20, 61/26*

U.S. Cl. 260—3 **9 Claims**

1. In a vulcanizable rubber composition consisting essentially of rubber, carbon black, a tire cord material and an N-(substituted oxymethyl)melamine having the following general formula



wherein X is hydrogen or lower alkyl having 1 to 8 carbon atoms; R_1, R_2, R_3, and R_4 are individually hydrogen, lower alkyl having 1 to 8 carbon atoms or the group $—CH_2OX$, wherein X is as defined above, the improvement which comprises an effective amount of 1,3-dimethylol urea which serves as the methylene acceptor.

3,992,335

SELF-SHINING FLOOR CARE COMPOSITIONS

Serge Denissenko, Migne-Auxances, France, and Joachim Dazzi, Riehen, Switzerland, assignors to Airwick Industries, Inc., Carlstadt, N.J.

Continuation-in-part of Ser. No. 89,057, Nov. 12, 1970, abandoned. This application Oct. 19, 1973, Ser. No. 408,144

Claims priority, application France, Nov. 14, 1969, 69.39210

Int. Cl.[2] C09G *1/16*

U.S. Cl. 260—13 **14 Claims**

1. A coating-forming liquid anhydrous composition comprising

a. as film-forming agent,

a solid macromolecular organic compound (A) which is independently film-forming or capable of being rendered film-forming by admixture therewith of from about 1 to 5% of a plasticizer, while being incapable by itself of plasticizing the said hard resin (b); the said film-forming compound (A) has at 20° C a Tukon hardness of at most 10 and, when plasticized in a molar ratio of 3:1 with dibutyl phthalate, has at 20° C a Sward hardness between 2 and 30; the said film-forming compound (A) is soluble in at least one of ethanol and isopropanol and is present in said liquid composition in a proportion of from 3 to 35%, based on the total weight of the latter composition;

b. as a varnish-constituent hard resin component, a resin (B) which is not film-forming by itself and which is insoluble in hydrocarbon solvents, which has a Tukon hardness at 20° C above 10 and, plasticized in a molar ratio of 3:1 with dibutyl phthalate, a Sward hardness at 20° C greater than 50; the lower limit temperature of its softening range being less than 60° C; said hard resin (B) being compatible with constituents (A), (E) and (D) and soluble in at least one of ethanol and isopropanol, and being present in a proportion of from 0.5 to 15%, based on the total weight of said liquid composition;

c. as plasticizing agent for at least one of components (A) and (B), a mixture of

c'. from about 0.05 to 20% based on the total weight of the composition of a liquid organic, hard resin-plasticizing compound (D) which has a melting point below 15° C, a molecular weight above 150, a viscosity, in undissolved state and at 20° C, of from 50 centipoises to 1000 poises, an acid number of at most 50, a refraction index at 20° C of from 1.350 to 1.550, a vapor pressure at 20° C of less than 0.001 Torr, and a drop of 0.1 gram of this liquid plasticizing compound placed on a glass plate requiring, at 20° C and under an ambient air pressure of 760 Torr, more than 2 hours for complete evaporation; this said plasticizing compound on being heated at 100° C for 100 hours showing a weight loss which ranges from 1 to 2.5% of the initial weight of the plasticizing compound; from 0 to at most 25%, calculated on the total weight of the said liquid composition, of the liquid plasticizing agent consisting of a silicone oil (C) having at 25° C a viscosity ranging from 0.5 to 100,000 centistokes; and

c''. from about 0.1 to 15%, based on the total weight of said liquid composition, of a solid plasticizing compound (E) which is compatible and miscible with compound (D), has a melting point above 40° C, a penetration index at 20° C between 1 and 80, a cube of 0.1 gram of which solid plasticizing compound placed on a glass plate at 20° C and under an ambient pressure of 760 Torr requires more than 2 hours for its complete evaporation, and being capable of plasticizing at least the film-forming agent (a) or the hard resin (b); and

d. as a volatile solvent mixture inert to components (A) to (E) inclusive, a mixture of an alkanol (F) of from 1 to 4 carbon atoms, present in a proportion of about 25 to 90%, calculated on the weight, of the said liquid composition, and an organic solvent (G) which is chemically unreactive toward all the other constituents, and is present in a proportion of 1 to 45% calculated on the weight of the said liquid anhydrous composition; said organic solvent (G) containing per molecule thereof from 0 to 2 hydroxyl groups; and, when containing per molecule a single hydroxyl group and being otherwise free from oxygen atoms, solvent (G) having at least five carbon atoms per molecule; the melting point of solvent (G) being below 15° C, its boiling point between 50° and 300° C, its viscosity at 20° C below 30 centipoises and, when its molecule is free of hydroxyl groups, a droplet of 0.5 milliliters thereof placed on a glass plate evaporating, at 20° C and an ambient air pressure of 760 Torr, in less than 3000 seconds; and, when its molecule contains from 1 to 2 hydroxyl groups, a droplet of 0.5 milliliters thereof evaporating at 20° C and 760 Torr in an interval of from 34 to 3000 seconds;

said plasticizer components (D) and (E) being soluble in said solvent mixture.

3,992,336

SHAPED ARTICLE FOR CONDITIONING HAIR FABRICATED FROM QUATERNARY NITROGEN-CONTAINING CELLULOSE ETHER

Joseph A. Faucher, Pleasantville, and Meyer R. Rosen, Spring Valley, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 1, 1974, Ser. No. 510,998

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.[2] A45D *24/00;* **A61K** *7/06;* **C08L** *1/28*

U.S. Cl. 260—17 R **7 Claims**

1. Shaped article for conditioning hair selected from the group consisting of combs, hair brushes and hair curlers which comprises a blend of a normally solid, water soluble organic polymer with a normally solid water insoluble organic polymer in which said polymers are present in an interpenetrating network and in which the ratio of water soluble organic poly-

mer to water insoluble organic polymer is in the range of 99:1 to 1:99.

3,992,337

FIRE RETARDANT THERMOPLASTIC POLYMER COMPOSITIONS

Paul Kraft, Spring Valley, and Siegfried Altscher, Monsey, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 333,595, Feb. 20, 1973, Pat. No. 3,857,906, which is a division of Ser. No. 49,204, June 23, 1970, Pat. No. 3,725,509. This application Oct. 31, 1974, Ser. No. 519,487

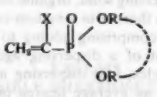
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C08L *1/32*

U.S. Cl. 260—17 R **8 Claims**

1. A fire retardant, thermoplastic polymer composition comprising an intimate admixture of a cellulosic resin selected from the group consisting of cellulose esters and mixed esters and cellulose ethers and an effective concentration to render said polymer composition flame retardant of a copolymer of:

1. at least one halogen containing, ethylenically unsaturated monomer selected from the group consisting of vinyl halides, vinylidene halides, chlorinated styrenes, halogenated C_1-C_{12} alkyl acrylates and methacrylates and halo-substituted nitriles of ethylenically unsaturated caboxylic acids; and
2. from about 2.5 to 99%, by weight of at least one bis(hydrocarbyl) vinylphosphonate having the structure:



wherein X is selected from the group consisting of hydrogen, halogen, cyano, aryl, C_1-C_{18} alkyl and

wherein R and R' are hydrocarbyl and substituted hydrocarbyl groups which can be the same, different or conjoint.

3,992,338

COATING COMPOSITIONS CONTAINING AN AMINOPLAST RESIN AND AN ALKYL ACID PHOSPHATE CURING AGENT

Paul R. Noyes, Philadelphia, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Aug. 21, 1974, Ser. No. 499,413

Int. Cl.² C08K *5/51;* **C08L** *33/06, 67/08, 61/26*

U.S. Cl. 260—21 **9 Claims**

1. A coating composition consisting essentially

A. 20–100% by weight, based on the weight of (A) plus (B), of a nitrogen resin crosslinking agent;

B. 80–0% by weight, based on the weight of (A) plus (B), of at least one flexibilizing component, having a hydroxyl and/or carboxyl group attached hereto, selected from the group consisting essentially of

I. a copolymer of at least one monomer selected from the group: styrene, alkyl esters of up to eight carbon atoms of acrylic and methacrylic acids with at least one other monomer selected from the group: acrylic acid, methacrylic acid, itaconic acid, hydroxyethyl acrylate, hydroxypropyl acrylate, hydroxyethyl methacrylate, and hydroxypropyl methacrylate: and

II. an alkyd resin prepared from fatty acid tri-glycerides, di- and polyols, and di- and poly-carboxylic acids and-/or anhydrides thereof; and

C. 7–10% by weight, based on the weight of (A) plus (B), of a blend of mono- and di-alkyl esters of phosphoric acid, wherein the molar ratio of mono-ester to di-ester is from 4:1 to 1:4 and the esterifying alcohol is selected from alcohols containing from eight to twelve carbon atoms and mixtures thereof and 0–2% by weight, based on the weight of (A) plus (B), of at least one member of the group selected from phosphoric acid and its lower alkyl esters of up to C-4.

3,992,339

PRIMERS FOR USE BETWEEN METAL SUBSTRATES AND BLOCK COPOLYMERS

James T. Harlan, Jr., and David J. St. Clair, both of Torrance, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 15, 1975, Ser. No. 577,579

Int. Cl.² C08K *5/01, 5/07;* **C08L** *93/00*

U.S. Cl. 260—27 BB **4 Claims**

1. A primer to be applied to metal substrates for a sealant containing a block copolymer having at least two poly(alpha-monoalkenyl arene) blocks and at least one elastomeric poly(-conjugated diene) block or the hydrogenated or partially hydrogenated derivative, thereof, where the primer consists essentially of:

a. about 1 to about 15 percent by weight of a block copolymer having the structure polystyrene-hydrogenated polybutadiene-polystyrene wherein the polystyrene blocks constitute about 8 percent to about 55 percent by weight of the block copolymer;

b. about 5 to about 50 percent by weight of an adhesion promotive resin having a solubility parameter in the range of about 8 to about 10;

c. about 0.01 to about 5 percent by weight of the silane $(CH_3O)_3Si(CH_2)_3SH$;

d. about 0.01 to about 2 percent by weight of an oxidation stabilizer; and

e. about 27 to about 94 percent by weight of a solvent having a solubility parameter in the range of about 7.5 to about 9.5 and a boiling point in the range of about 70° C to about 150° C.

3,992,340

VULCANIZED MOLDING COMPOSITIONS BASED ON BITUMEN AND OLEFIN POLYMERS

Eckhard Bonitz, Frankenthal, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

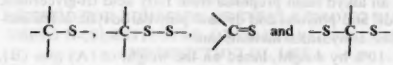
Filed July 13, 1971, Ser. No. 162,274

Int. Cl.² C08L *95/00*

U.S. Cl. 260—28.5 AS **10 Claims**

1. A process for the production of a vulcanized composition of matter which comprises mixing

1. an olefin polymer having an X-ray crystallinity of more than 20% by weight at 25° C and selected from the group consisting of homopolymers of ethylene, propylene and butene-1, copolymers of ethylene and butene-1, and copolymers of ethlene with other ethylenically unsaturated monomers, said copolymers containing more than 50% by weight of ethylene units;
2. sulfur;
3. a vulcanization accelerator selected from the group consisting of compounds containing the following structures:



at a temperature of from 80° to 250° C; adding to said mixture 4. bitumen having a penetration of from 10 to 300;
and thereafter homogenizing the mixture at a temperature of from 80° to 250° C, the ratio of component 4 to component 1 being from 1:0.005 to 0.05:1 by weight, the amount of sulfur being from 0.05 to 30% by weight based on the combined weights of said components 4 and 1, and the amount of said component 3 being from 0.01 to 5% by weight based on the combined weights of said components 4 and 1.

3,992,341

FILAMENTS AND FIBERS AND THEIR MANUFACTURE

Gerhard Zeitler, Hessheim, and Heinz Mueller-Tamm, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 30, 1975, Ser. No. 573,164

Claims priority, application Germany, May 28, 1974, 2425665

Int. Cl.² C08L *95/00*

U.S. Cl. 260—28.5 AS **1 Claim**

1. Drawn filaments and fibers based on polypropylene or copolymers thereof with from 1 to 10% molar of ethylene or butene-1 and having an intrinsic viscosity of from 1 to 10, which contain from 10 to 90% by weight of bitumen having a penetration of from 0.1 to 80 and a softening point of from 40° to 150° C.

3,992,342

NON-AQUEOUS DISPERSION AND PROCESS OF PREPARING SAME

Kazuo Tsubuko, Yokohama; Yukihiko Nakagawa, Chiba; Kenichi Matsubayashi, Yokohama, and Yoshihiko Kido, Numazu, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed July 10, 1975, Ser. No. 594,805

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5A **4 Claims**

1. A non-aqueous dispersion containing a graft copolymer and from one to 50 parts by weight, based on the weight of said graft copolymer, of at least one substance selected from the group consisting of polyethylene, polyethylene wax and paraffin wax having a softening point of 60° C to 130° C, in an organic liquid carrier having a high resistivity and a low dielectric constant, which non-aqueous dispersion has been prepared by carrying out successively the following three steps (a), (b) and (c) in said liquid carrier at an elevated temperature, adding said substance in one of the three steps and then cooling the reaction product of step (c) with vigorous stirring:
a. copolymerizing from 99.9 to 80 parts by weight of a monomer having the formula (I):

(I)

, wherein R is hydrogen or methyl, A is $-COOC_nH_{2n+1}$ or $-OC_nH_{2n+1}$, and n is an integer of 6 to 20, with from 0.1 to 20 parts by weight of at least one compound selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid, maleic acid, glycidyl acrylate and glycidyl methacrylate,
b. esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of glycidyl acrylate or glycidyl methacrylate when said copolymer has been prepared by using acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid or maleic acid, or esterifying 100 parts by weight of the copolymer obtained in step (a) with from 0.1 to 20 parts by weight of acrylic acid, methacrylic acid, fumaric acid, crotonic acid, itaconic acid or maleic acid when said copolymer has been prepared by using glycidyl acrylate or glycidyl methacrylate, and then
c. grafting 100 parts by weight of the esterified copolymer obtained in step (b) with from 5 to 100 parts by weight of a monomer having a vinyl group selected from the group consisting of acrylic acid, methacrylic acid, a lower alkyl ester of acrylic acid or methacrylic acid, styrene, methylstyrene and vinyl acetate.

3,992,343

PROCESS FOR DISPERSING UNDISSOLVED SOLID, ORGANIC OR INORGANIC COLORANT PARTICLES

Heinz Haschke; Gerhard Morlock, both of Grossauheim; Horst Krüger, Darmstadt, and Gerhard Hebbel, Traisa, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

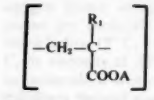
Filed July 24, 1973, Ser. No. 382,258

Claims priority, application Germany, July 26, 1972, 2236594

Int. Cl.² C08G *2/00;* **C08J** *3/20*

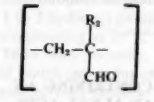
U.S. Cl. 260—29.6 N **11 Claims**

1. Process for dispersing solid, organic or inorganic colorant particles or mixtures thereof in a system comprised mainly of water, said process comprising adding to said system about 0.05–10% by weight of a dispersing agent, related to the weight of said particles, said dispersing agent being at least one polymer having an average degree of polymerization of about 10–500, said polymer derived from;
a. Y + W/2 mole percent units of the general formula



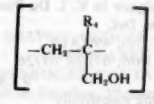
(I)

b. U-W mole percent units of the general formula



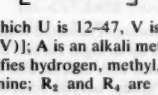
(II)

c. W/2 mole percent units of the general formula



(IV) and

d. V mole percent units of the general formula



(V)

in which U is 12–47, V is 1–25, W is O–U, and Y is [100–(U+V)]; A is an alkali metal, hydrogen or ammonium ion; R_1 signifies hydrogen, methyl, hydroxy methyl, ethyl, chlorine or bromine; R_2 and R_4 are the same or different and signify hydrogen or hydroxymethyl; and whereby for W unlike zero, the quotient of mole percent carboxyl or carboxylate groups to mole percent hydroxyl groups is about 2–16.

3,992,344

PRODUCTION OF NON-FOAMING AQUEOUS SUSPENSIONS OF POLYETHYLENE OR POLYPROPYLENE FIBRIDS

Bruno Sander, Ludwigshafen; Eckhard Bonitz, Frankenthal; Heinz Berbner, Moerlenbach, and Manfred Hoffmann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 515,550, Oct. 17, 1974, Pat. No. 3,950,293. This application Nov. 19, 1975, Ser. No. 633,292
Claims priority, application Germany, Oct. 18, 1973, 2352190
Int. Cl.² C08L 23/02
U.S. Cl. 260—29.6 RW 5 Claims

1. A process for the manufacture of non-foaming aqueous suspensions of polyolefin fibrids by dispersing polyethylene fibrids or polypropylene fibrids in water in the presence of a dispersing agent, said fibrids having a specific surface area of 1–150 m^2/g, the improvement wherein the dispersing agent used consists of from 0.1 to 2.0% by weight, based on the dry weight of the fibrids, of an ammonium salt of a copolymer of maleic acid and vinyl isobutyl ether.

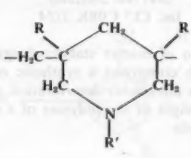
3,992,345

WATER-DISPERSIBLE THERMOSETTABLE CATIONIC RESINS AND PAPER SIZED THEREWITH

David H. Dumas, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 393,689, Aug. 31, 1973, Pat. No. 3,923,745. This application Sept. 8, 1975, Ser. No. 611,379
Int. Cl.² C08F 8/08, 6/24; C08G 18/04, 69/48
U.S. Cl. 260—29.7 AT 6 Claims

1. An aqueous dispersion of a water-insoluble, water-dispersible thermosettable cationic resin derived by reacting (I) an epihalohydrin and (II) a water-insoluble modified diallylamine polymer derived by reaction of (a) a diallylamine polymer consisting essentially of units of the formula



where R is hydrogen or a C_1–C_4 alkyl and R′ is hydrogen, methyl, or ethyl and of the number of R's present in the polymer from 100% to 5% thereof are hydrogen and from 95% to 0% thereof are methyl or ethyl, and (b) a hydrophobizing compound selected from the group consisting of acyl halides, acid anhydrides, ketene dimers, and organic isocyanates, said hydrophobizing compound having a total of from about 12 to about 40 carbon atoms, the said modified diallylamine polymer having at least about 50% amine functionality, said reaction of (a) and (b) being carried out under a nitrogen blanket at a reaction temperature of from about 0° C. to about 100° C. and a pH of about 6 to 8, the amount of epihalohydrin employed being that amount sufficient to react with substantially all the amine functionalities of the water-insoluble modified diallylamine polymer.

3,992,346

PRODUCTION OF HIGHLY FLEXIBLE COATINGS

Heinrich Hartmann, Limburgerhof; Ruprecht Kroker, Ludwigshafen, and Herbert Spoor, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 338,757, March 7, 1973, abandoned. This application Jan. 15, 1975, Ser. No. 541,246
Claims priority, application Germany, Mar. 8, 1972, 2211059
Int. Cl.² C08G 8/08
U.S. Cl. 260—57 R 8 Claims

1. A surface coating which contains as a binder a saturated linear polyester which consists of units of:

a. 100% molar of at least one dicarboxylic acid selected from the group consisting of phthalic acid, isophthalic acid, terephthalic acid, phthalic anhydride, and esters of said acids with lower alcohols

b. from 50 to 95% molar of at least one diol selected from the group consisting of diols of the formula $HO(CHR-)_nOH$ in which R is hydrogen or methyl and n is one of the integers from 2 to 10 and gemdialkylglycols of five to eleven carbon atoms; and

c. from 5 to 50% molar of neopentylglycol hydroxypivalate; wherein said linear polyester has a melting point range of from 60° to 150° C; a K value of from 20 to 45 measured in dimethylformamide; and is soluble in organic solvents such as cyclohexanone, methyl isobutyl ketone, dioxane, methyl glycol acetate, ethyl glycol acetate and butyl glycol acetate.

3,992,347

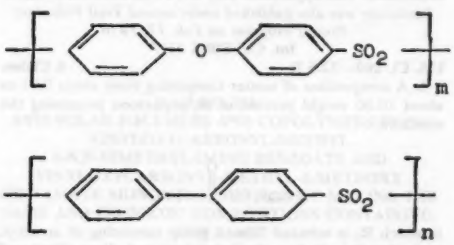
ARLOXYSULFONE COPOLYMER SOLUTION HAVING PERFLUORO-CARBON POLYMER PARTICLES DISPERSED THEREIN

Eva M. Vary, Wynnewood, Pa., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Continuation of Ser. No. 375,049, June 29, 1973, abandoned. This application Sept. 11, 1975, Ser. No. 612,550
Int. Cl.² C08K 5/01, 5/02, 5/15, 5/34
U.S. Cl. 260—30.2 4 Claims

1. A topcoating composition comprising 5–60% by weight, based on the weight of the total composition, of a binder; said binder consisting essentially of

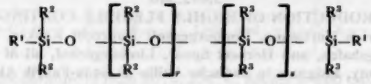
1. 33–43% by weight, based on the weight of the binder, of an aryloxysulfone copolymer of the formula:



where m and n are positive integers from 15 to 2,500;

2. 52–62% by weight, based on the weight of the binder, of a uniformly dispersed perfluorocarbon polymer selected from the group consisting of polytetrafluoroethylene and a copolymer of tetrafluoroethylene and hexafluoropropylene, wherein the perfluorocarbon polymer has a particle size of about 0.01 to 6 microns in diameter; and

3. 4–6% by weight, based on the weight of the binder, of a silicone resin of the formula:



where R^1 is a monovalent radical selected from the group consisting of hydroxyl, hydrogen, and alkyl group having 1–8 carbon atoms, and an aryl group, R^2 and R^3 are monovalent radicals selected from the group consisting of hydrogen, an alkyl group having 1–8 carbon atoms and an aryl group, and where r and s are positive integers from 0 to 3000, wherein the sum of the components is not more than 100%; and

40–95%, by weight based on the weight of the total composition, of a solvent for the aryloxysulfone copolymer.

3,992,348

METHOD FOR THE PREPARATION OF MOLDABLE FILLED POLYMETAL ACRYLATE

John F. Jones, and Bernard Dubrow, both of Torrance, Calif., assignors to TRW Systems and Energy, Redondo Beach, Calif.

Filed Sept. 21, 1970, Ser. No. 74,179
Int. Cl.² C08J *3/18, 3/20;* **C08K** *3/26, 5/51*
U.S. Cl. 260—30.6 R **5 Claims**

1. A method of making moldable filled polymetal acrylates comprising:

A. adding a monomeric organic acid selected from the group consisting of acrylic acid, methacrylic acid, β-propylacrylic acid, α-chloracrylic acid, β-chloracrylic acid, β-vinylacrylic acid to a predominant amount of a polyvalent metal carbonate in a stirred aqueous slurry, said carbonate in a molar ratio range of from 25 to 1 for each mole of acid;

B. heating the mixture formed to its boiling point;

C. adding a free radical catalyst;

D. cooling said mixture whereupon particles precipitate; and

E. removing the precipitated particles.

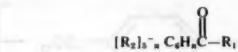
3,992,349

PHOTODEGRADABLE POLYOLEFIN COMPOSITION CONTAINING A MIXTURE OF AN ARYL KETONE AND AN ALKANOLAMINE

Allen K. Sparks, Basking Ridge, N.J., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 428,561, Dec. 26, 1973, abandoned. This application July 17, 1975, Ser. No. 596,692
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C08K *5/17*
U.S. Cl. 260—32.6 R **6 Claims**

1. A composition of matter comprising from about 0.01 to about 10.00 weight percent of an arylketone possessing the structure:



in which R_1 is selected from a group consisting of an alkyl, aryl, alkaryl, aralkyl, cycloalkyl, substituted alkyl, substituted aryl, substituted alkaryl, substituted aralkyl or substituted cycloalkyl radical and R_2 is selected from a group consisting of an alkyl, aryl, alkaryl, aralkyl, cycloalkyl, alkoxy, halogen, carboxy, carboalkoxy, substituted alkyl, substituted aryl, substituted alkaryl, substituted aralkyl, substituted cycloalkyl, substituted alkoxy, substituted carboxy and substituted carboalkoxy radical, and in which n is equal to an integer between 0 and 5; 0.01 to about 10.00 weight percent of an alkanol amine prepared from the reaction of an aliphatic amine or polyamine with one or more equivalents of an olefinic epoxide; and about 80.00 to about 99.98 weight percent of an olefinic polymer selected from the group consisting of polypropylene, polyethylene and polybutene.

3,992,350

PROCESS OF MIXING FILLERS WITH POLYTETRAFLUORETHYLENE AND TETRAFLUORETHYLENE COPOLYMERS

Rene Bensa, Tassin-La-Demi-Lune; Andre Monnet, Lyon, and Gabriel Vincent, Oullins, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Saint-Denis, France

Continuation of Ser. No. 355,468, April 30, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,754
Claims priority, application France, May 4, 1972, 72.15808
Int. Cl.² C08K *3/04, 3/10, 3/40, 5/01*
U.S. Cl. 260—33.6 F **3 Claims**

1. The method of preparing filled polytetrafluoroethylene or tetrafluoroethylene copolymers which comprises (a) mixing polytetrafluoroethylene or a tetrafluoroethylene copolymer containing at least 50 per cent by weight of tetrafluoroethylene in the copolymer, with a mineral filler, and (b) crushing or grinding the mixture under conditions such that (i) the temperature of the mixture at the beginning of the crushing or grinding is in the range of from about −80° C to about −25° C and (ii) the temperature of the mixture does not exceed about +15° C at the end of the crushing or grinding operation.

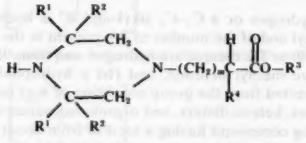
3,992,351

ALKYL ALKANOATE DERIVATIVES OF SUBSTITUTED PIPERAZINES AND POLYMER COMPOSITIONS STABILIZED THEREBY

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 332,839, Feb. 15, 1973, Pat. No. 3,899,491, which is a continuation-in-part of Ser. No. 239,350, March 29, 1972, abandoned. This application May 30, 1975, Ser. No. 582,563
Int. Cl.² C08K *5/34*
U.S. Cl. 260—45.8 N **21 Claims**

1. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing from 0.05% to 5% by weight of the polymer of a stabilizing compound of the formula



wherein

R^1 and R^2 are methyl or together with the carbon to which they are bound form a mono-cyclic ring system having 5 or 6 carbon atoms;

R^3 is an alkyl group of from 1 to 20 carbon atoms;

R^4 is hydrogen or methyl, and

m is 0 or 1.

3,992,352

FIRE RETARDANT POLYESTER RESINS

Robert M. Murch, Ashton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 480,919, June 19, 1974, Pat. No. 3,943,196. This application Oct. 24, 1975, Ser. No. 625,792
Int. Cl.² C08K 5/49
U.S. Cl. 260—45.9 NP 5 Claims

1. A polymer having enhanced fire retardancy properties comprising a polyester resin and an adduct of the formula: $RO)_3PCl_2{\cdot}(Me_2N)_3PO$ wherein R is selected from the group consisting of $ClCH_2CH_2$, Cl_3CCH_2, $Cl_3CCH_2CH_2$, $(ClCH_2)_2CH$, $CH_2BrCHBrCH_2$, C_2H_5, and CH_3.

3,992,353

FIRE RETARDANT POLYESTER RESINS

Robert M. Murch, Ashton, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 480,912, June 19, 1974, Pat. No. 3,943,197. This application Oct. 24, 1975, Ser. No. 625,794
Int. Cl.² C08K 5/51
U.S. Cl. 260—45.9 NP 5 Claims

1. A polymer having enhanced fire retardancy properties comprising a polyester resin and an adduct of the formula: $(RO)_3PCl_2{\cdot}(Me_2N)_3PO$ wherein R = $ClCH_2CH_2$, Cl_3CCH_2, $(ClCH_2)_2CH$, $CH_2BrCHBrCH_2$, CH_3, and C_2H_5.

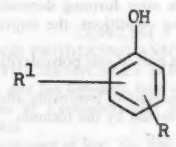
3,992,354

PHENOLIC ANTIOXIDANTS PREPARED FROM A PENTACYCLO-TETRADECA-5,11-DIENE

Kirkwood S. Cottman, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 467,424, May 6, 1974, Pat. No. 3,935,281. This application Aug. 21, 1975, Ser. No. 606,830
Int. Cl.² C08K 5/13
U.S. Cl. 260—45.95 H 5 Claims

1. A polymer subject to oxidation having incorporated therein an antioxidant amount of a reaction product prepared by reacting a mixture comprising (A) at least one phenolic reactant conforming to the following structural formula



wherein R is selected from the group consisting of hydrogen, alkyl radicals having from 1 to 12 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms, aralkyl radicals having from 7 to 12 carbon atoms, substituted and unsubstituted aryl radicals having 6 to 12 carbon atoms, alkoxy radicals having from 1 to 12 carbon atoms, cycloalkoxy radicals having from 5 to 12 carbon atoms and aralkoxy radicals having from 7 to 12 carbon atoms and R^1 is selected from the group consisting of hydrogen and tertiary alkyl radicals having from 4 to 12 carbon atoms and (B) pentacyclo $[_{8,2,1,1}{}^{4,7},0^{2,9},0^{3,8}]$tetradeca-5,11-diene, in the presence of a Friedel-Crafts catalyst, at a temperature of from 25° C. to 160° C., the molar ratio of the pentacyclo compound to the phenolic reactant being from 1:1 to 1:10.

3,992,355

HEAT-CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

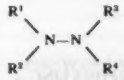
Kunio Itoh; Takeo Yoshida, and Hironao Fujiki, all of Annaka, Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan

Filed Jan. 21, 1975, Ser. No. 542,823
Claims priority, application Japan, Jan. 25, 1974, 49-10669
Int. Cl.² C08F 11/04
U.S. Cl. 260—46.5 UA 11 Claims

1. A heat-curable organopolysiloxane composition comprising (1) 100 parts by weight of a diorganopolysiloxane having the average formula

$$R_nSiO_{4-n/2}$$

where R is a substituted or unsubstituted monovalent hydrocarbon group selected from the group consisting of alkyl, halogen substituted alkyl, halogen-substituted alkyl groups, alkenyl groups, aralkyl groups, aryl, and halogen substituted aryl, and has an average value of from 1.98 to 2.01, which contains at least two vinyl groups per molecule and the viscosity of which exceeds 100 centistokes at 25° C, (2) from 10 to 200 parts by weight of an inorganic filler, (3) an organohydrogenpolysiloxane containing at least two Si-H linkages per molecule in an amount sufficient for giving the Si-H linkages from 0.5 to 15 times in number compared to the vinyl groups contained in component (1) above, (4) platinum or a platinum-containing compound in a catalytic amount, and (5) a hydrazine compound having the general formula



where R^1, R^2, R^3 and R^4 each represent a hydrogen atom, a phenyl group or an alkyl group having from 1 to 8 carbon atoms, provided always at least one of them is a phenyl or alkyl group, in an amount larger than 10% by weight of the amount of component (4) as platinum.

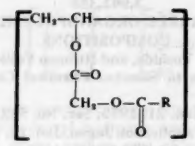
3,992,356

ANTI-SOLAR POLYMERS AND COPOLYMERS FROM VINYLOXYCARBONYL-METHYL 4-N,N-DIMETHYLAMINO BENZOATE AND VINYLOXYCARBONYL-METHYL-4-METHOXY CINNAMATE MONOMEAS, METHOD OF MAKING THE SAME AND COSMETIC COMPOSITIONS CONTAINING THE SAME

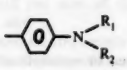
Bernard Jacquet, Antony; Christos Papantoniou, Epinay-sur-Seine; Pierre Dufaure, Paris, and Claude Mahieux, Paris, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed June 27, 1973, Ser. No. 374,059
Claims priority, application Luxemburg, June 29, 1972, 65622
Int. Cl.² C08G 2/28
U.S. Cl. 260—47 UA 13 Claims

1. Anti-solar polymer useful in cosmetic applications having in the macromolecular chain a unit of the formula



wherein R is



wherein R_1 and R_2 represent alkyl having 1–3 carbon atoms, said anti-solar polymer being selected from the group consisting of a homopolymer and a copolymer, said copolymer further containing a unit derived from an ethylenically unsaturated monomer and said unit having the structural formula given above being present in an amount between about 10–100 percent of the total weight of the polymer.

3,992,357

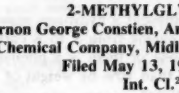
POLYCARBONATES INCORPORATING 2-METHYLGLYCEROL RESIDUES

Vernon George Constien, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 13, 1974, Ser. No. 469,204
Int. Cl.² C08G 63/62
U.S. Cl. 260—47 XA **5 Claims**

1. A linear thermoplastic polycarbonate which comprises a reaction product under polycarbonate forming conditions of

1. a carbonyl halide,
2. a dihydric phenol, and
3. a prepolymer having the formula



wherein B is the divalent residue from a dihydric phenol and *n* is 1–5 wherein the prepolymer comprises 2–60 weight percent of the polycarbonate.

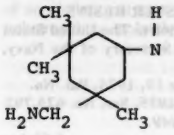
3,992,358

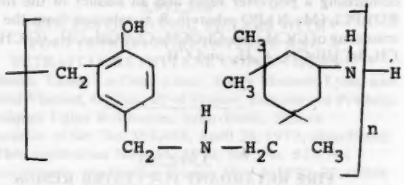
EPOXY RESIN COMPOSITIONS

Rainer Schinabeck, Scituate, Mass., assignor to American Velodur Metal, Inc., Scituate, Mass.

Continuation-in-part of Ser. No. 566,968, April 10, 1975, Pat. No. 3,935,252. This application May 20, 1975, Ser. No. 579,203
The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.
Int. Cl.² C08G 59/06
U.S. Cl. 260—47 EN **8 Claims**

1. A hardenable composition comprising: (1) a compound having more than one 1,2-epoxide grouping per molecule and (2) a hardening agent of the formula:





wherein *n* has a value of at least 2.

3,992,359

ALKALI METAL HYDROXIDE AND PHENOL SULFONATE DYEABILITY ADDITIVE IN POLYESTERIFICATION PROCESS

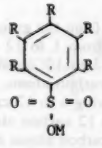
James W. Cleary, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 3, 1974, Ser. No. 502,856
Int. Cl.² C08G 63/68
U.S. Cl. 260—75 S **10 Claims**

1. In a polyesterification process comprising contacting a dicarboxylic acid or its ester forming derivative and a diol under polyester forming conditions, the improvement comprising:

carrying out at least a part of said polyesterification process in the presence of

a. an effective dye receptivity improving amount of a phenolsulfonate represented by the formula



wherein M is an alkali metal and wherein R is selected from hydrogen, hydroxyl or alkyl radicals containing from one to five carbon atoms; and wherein one and only one R is a hydroxyl group; and

b. an effective viscosity-modifying amount of an alkali metal hydroxide.

3,992,360

TRANSPARENT POLYAMIDES FROM 1,3-BIS-(AMINOMETHYL)-CYCLOHEXANE AND ALIPHATIC AMINO CARBOXYLIC ACID

Ludwig Brinkmann, Frankfurt am Main, and Walter Herwig, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 27, 1973, Ser. No. 428,819

Claims priority, application Germany, Dec. 29, 1972, 2263929

Int. Cl.² C08G *69/08*

U.S. Cl. 260—78 A **17 Claims**

1. A transparent polyamide consisting essentially of the polymeric condensation product of

a. a mixture of 50 to 100 mol % of 1,3-bis-(aminomethyl)-cyclohexane and 50 to 0 mol % of 1,4-bis-(aminomethyl)-cyclohexane, based on the total amount of the bis-(aminomethyl)-cyclohexane components,

b. at least one aromatic carbocyclic dicarboxylic acid containing from 6 to 20 carbon atoms

c. at least one aliphatic amino-carboxylic acid having from 2 to 20 carbon atoms or a lactam thereof, and

d. a fourth component selected from the group consisting of (i) straight chain or branched chain aliphatic diamines containing 2 to 20 carbon atoms, (ii) saturated straight chain or branched chain aliphatic dicarboxylic acids containing from 2 to 20 carbon atoms and mixtures of (i) and (ii), the amount of aminocarboxylic acid or lactam thereof at least 2.5 mol %, the amount of said fourth component being at least 2.5 mol % and the total amount of amino-carboxylic acid or lactam thereof and said fourth component being from 5 mol % to 80 mol % based on the total amount of components (a) through (d), said polyamide having a reduced specific viscocity of 0.6 to 3 dl/g as measured at a concentration of 1 gram of polyamide in 100 ml of a 60:40 weight mixture of phenol/tetrachloroethane at 25° C.

3,992,361

METHOD FOR PRODUCING ANIONIC POLYAMIDES WITH CHEMICALLY BONDED DYE

Zbynek Bukac, and Jan Sebenda, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 500,057, Aug. 23, 1974, abandoned. This application Jan. 16, 1975, Ser. No. 541,618

Claims priority, application Czechoslovakia, Aug. 29, 1973, 6009/73

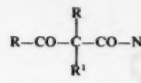
Int. Cl.² C08G *69/20*, *69/24*

U.S. Cl. 260—78 L **4 Claims**

1. A colored polyamide having a dye chemically bound therein produced by polymerization of lactams in the presence of at least one colored co-catalyst having the formula

$$X - Ar - N = N - Ar - Y$$

wherein Ar is an aryl having 1 to 3 benzene rings selected from the group consisting of phenylene and naphthylene, Y is X, H, C_{1-6} alkyl, C_{1-6} alkoxy, aralkyl having 1 to 6 carbon atoms in the alkyl moiety or di lower C_{1-5} alkylamino, X is



wherein R is C_{1-18} alkyl, cycloalkyl having 5 to 6 carbon atoms in the ring, an aryl as above defined having 1 or 2 benzene rings, or aralkyl having 1 or 2 carbon atoms in the alkyl moiety and R^1 is R as above defined or H.

3,992,362

FRIABLE TERTIARY AMYL PHENOL SULFIDES AS VULCANIZING AGENT

Le Roy Martin, Riverview, Mich., assignor to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 432,257, Jan., 1974. This application Aug. 14, 1975, Ser. No. 604,584

Int. Cl.² C08F *28/00*; C08G *75/14*

U.S. Cl. 260—79.5 C **4 Claims**

1. In the manufacture of a vulcaized elastomeric product, the process which comprises mixing 100 parts by weight of a sulfur curable vulcanizable polymerizate selected from the group consisting essentially of styrene-butadiene copolymer, chlorobutyl rubber, natural rubber and ethylene-propylene diene copolymer with about 5 to 25 parts by weight of para tertiary amyl phenol sulfides having a softening point of at least 118° C. and thereafter vulcanizing the mixture.

3,992,363

PHOTOPOLYMERIZATION INITIATORS

Ralph H. Reiter, and George Rosen, both of Wayne, N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 455,667, March 28, 1974, Pat. No. 3,929,490. This application Nov. 18, 1974, Ser. No. 524,971

Int. Cl.² C08F *8/18*, *12/12*; C08G *61/10*

U.S. Cl. 526—292 **2 Claims**

1. Poly(trichloroacetyl-α-methylstyrene).

2. Poly(trichloroacetylstyrene).

3,992,364

PHYSIOLOGICALLY ACTIVE POLYPEPTIDE PREPARATION

Walter Kuhlmey, Heerstrasse 55, 28 Bremen, Schwachhauser, Germany

Continuation-in-part of Ser. No. 146,523, May 24, 1971, abandoned, which is a continuation of Ser. No. 622,009, Feb. 21, 1967, abandoned. This application Dec. 2, 1975, Ser. No. 637,022

Claims priority, application United Kingdom, Feb. 22, 1966, 7753/66

Int. Cl.² C07G *7/026*

U.S. Cl. 260—112 R **7 Claims**

1. The method of preparing a physiologically active polypeptide effective for lowering cholesterol levels in blood and increasing the 17-keto-steroid elimination when administered orally or parenterally to human patients which comprises adding water to minced animal organs rich in reticulo-endotelial tissue, stirring a proteolytic enzyme into the mass, maintaining the mixture at a temperature, from about 40° C to not substantially above 45° C for at least 5 hours and not more than about 72 hours, filtering the solution from the solids, and separating a polypeptide from the filtrate having a molecular weight less than 5,000, an isoelectric point at a pH of about 5.5 and an Rf value between 0.5 and 0.6 in Partridge solution.

7. The physiologically active short chain polypeptide obtained by the method of claim 1 and consisting of the following 17 amino acids:

Lysine

Histidine
Arginene
Asparagine acid
Threonine
Serine
Glutamic acid
Proline
Glycine
Alanine
Cysteine
Valine
Methionine
Isoleucine
Leucine
Tryosine
Phenylalanine.

3,992,365

AGONIST ANALOGUES OF LUTEINIZING HORMONE RELEASING HORMONE

Christopher Raymond Beddell, Ashford; Lawrence Alfred Lowe, Swanley, and Samuel Wilkinson, Beckenham, all of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

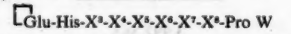
Filed Oct. 31, 1974, Ser. No. 519,667

Claims priority, application United Kingdom, Nov. 1, 1973, 50811/73; Oct. 10, 1974, 43917/74

Int. Cl.[2] C07C *103/52;* **A61K** *37/00*

U.S. Cl. 260—112.5 LH **27 Claims**

1. A peptide of the formula



an acid addition salt thereof or a complex thereof with a pharmaceutically acceptable metal, wherein

X^3 and X^5 are the same or different and each is phenylalanyl optionally substituted in the benzene ring with a group selected from the group consisting of methoxy, chlorine, methyl, hydroxyl, nitro, and amino;

X^4 and X^6 are the same or different and each is selected from glycyl, alanyl (D- or L-) and asparaginyl;

X^7 is selected from the group consisting of leucyl, isoleucyl, valyl and phenylalanyl, where the phenylalanyl is optionally substituted in the benzene ring with a group selected from the group consisting of methoxy, chlorine, methyl, hydroxyl, nitro and amino;

X^8 is selected from the group consisting of arginyl, lysyl, histidyl, homoarginyl, glycyl and phenylalanyl, where the phenylalanyl is optionally substituted in the benzene ring with a group selected from the group consisting of methoxy, chlorine, methyl, hydroxyl, nitro and amino; and

W is selected from glycine amide and a group $—NR^1R^2$ where R^1, R^2 and the nitrogen atom together comprise a group selected from amino, N-alkylamino, N,N-dialkylamino, pyrrolidino, morpholino and 1-methyl-5-aminomethyl tetrazolyl, the 'alkyl' having from 1 to 4 carbon atoms and being optionally substituted by an hydroxyl group, where all references are to the L-amino acids and their radicals except in the case of glycine and unless otherwise stated.

3,992,366

PROCESS FOR CROSSLINKING HYDROPHILIC COLLOIDS

Thomas Stauner, Marly, and Rainer Kitzing, Villars sur Glane, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland.

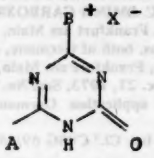
Filed Feb. 27, 1974, Ser. No. 446,243

Claims priority, application Switzerland, Mar. 9, 1973, 3517/73

Int. Cl.[2] C08F *116/06;* **C09H** *7/00*

U.S. Cl. 260—117 **26 Claims**

1. Process for crosslinking hydrophilic colloids which contain amino, imino and/or hydroxyl groups, which comprises using a crosslinking compound of the formula



wherein A is hydrogen, hydroxyl, halogen, acylamino, an immoniumether radical, the radical of the formula

wherein R_1 and R_2 independently of one another are hydrogen, unsubstituted or substituted alkyl, alkenyl, alkinyl, cycloalkyl with 5 or 6 carbon atoms, aryl or aralkyl or together with the nitrogen atom to which they are bonded form a saturated ring which may contain yet other heteroatoms, or the radical of the formula

wherein R_3, R_4 and R_5 independently of one another are hydrogen, unsubstituted or substituted alkyl, alkenyl, alkinyl, cycloalkyl, aryl or aralkyl or together with the nitrogen atom to which they are bonded form a saturated or unsaturated ring which may contain yet other hetero-atoms, b^+ is an ammonium or phosphonium radical and X^- is an anion.

3,992,367

PROCESS FOR THE PREPARATION OF PURIFIED ALBUMIN BY THERMOCOAGULATION AND ALBUMIN OBTAINED BY SAID PROCESS

Robert A. M. Plan, Lyon; Jacques C. Liautaud, Limonest; Marie-France Makula, Lyon; Paule A. Gattel, Caluire; Jean F. Pla, Sainte-Foy-Les-Lyon, and Andre J. M. Debrus, Lyon, all of France, assignors to Institut Merieux, Lyon, France

Filed July 3, 1973, Ser. No. 376,204

Claims priority, application France, July 5, 1972, 72.24311

Int. Cl.[2] C07G *7/00*

U.S. Cl. 260—122 **17 Claims**

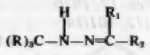
1. Process of preparation of purified albumin substantially free of hemoglobin and foreign or denatured proteins from an impure albumin solution to be purified from which a major part of the hemoglobin has been eliminated, said impure albumin solution containing said foreign or denatured proteins and remaining traces of hemoglobin and having a protein content less than 50 grams per liter, comprising thermocoagulating said foreign or denatured proteins and said remaining traces of hemoglobin by heating said solution to be purified in the presence of a member selected from the group consisting of caprylic acid and a salt thereof at a pH between 4.8 and 5.25, the amount of said member, expressed in weight of sodium caprylate, being between 15% and 30% of the weight of proteins in said solution to be purified, said heating being carried out at a temperature between 50° C and 64° C and wherein the pH of the impure albumin solution is selected so as to be the greater as the proportion of the caprylate content relative to the protein content is increased.

3,992,368
OXIDATION PROCESS FOR PREPARING α-HYDROXYAZO COMPOUNDS

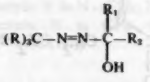
Ronald Edward MacLeay, Williamsville, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Mar. 21, 1974, Ser. No. 453,450
Int. Cl.² C07C *107/02*
U.S. Cl. 260—192 5 Claims

1. A process comprising reacting a hydrazone compound having the formula:



with an aqueous non-acidic solution of an oxidizing agent selected from the group consisting of alkali metal hypochlorites, alkali metal hypobromites, alkaline earth metal hypochlorites and alkaline earth metal hypobromites, thereby producing an α-hydroxyazo compound having the formula:



wherein in both of said formula:

R, R_1 and R_2 independently are alkyl, cycloalkyl, bicycloalkyl, tricycloalkyl or aralkyl;

or one R is hydrogen or aryl, or the R's are joined together to form cycloalkyl, bicycloalkyl or tricycloalkyl;

or R_2 is aryl;

or R_1 and R_2 are joined together to form alkylene; and

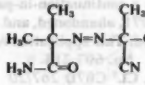
R_1 and R_2 are independently unsubstituted or substituted by alkoxy, aryloxy, alkyl, fluoro, chloro, bromo or cyano.

3,992,369
2-[(1-CYANO-1-METHYLETHYL)AZO]-2-METHYLPROPIONAMIDE

Earl Phillip Moore, Jr., Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 357,524, May 7, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,685
Int. Cl.² C07C *107/02*; C08F *116/02*, *116/12*, *120/00*
U.S. Cl. 260—192 1 Claim

1. The compound

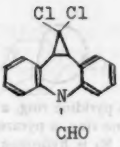


3,992,370
1,1-DICHLORO-1A,1B-DIHYDRODIBENZO(B,F)CYCLOPROP(D)AZEPINE-6(1H)-CARBOXALDEHYDE

Kenya Kawashima; Takahiro Saraie; Yasuhiko Kawano, and Toshihiro Ishiguro, all of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Japan

Filed Jan. 23, 1974, Ser. No. 435,965
Claims priority, application Japan, Feb. 3, 1973, 48-13987
Int. Cl.² C07D *223/22*
U.S. Cl. 260—239 D 1 Claim

1. Compound of the formula

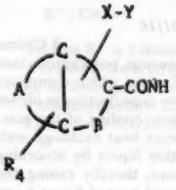


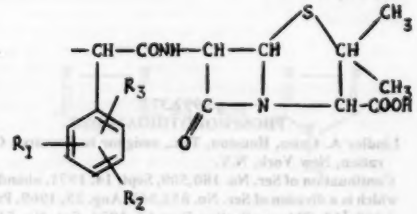
3,992,371
PENICILLINS SUBSTITUTED WITH HETEROCYCLIC AND SUBSTITUTED PHENYL GROUPS

Hisao Tobiki, Kobe; Hirotada Yamada; Iwao Nakatsuka, both of Nishinomiya; Kozo Shimago, Takarazuka; Shigeru Okano, Kawanishi; Takenari Nakagome, Nishinomiya; Toshiaki Komatsu, Takarazuka; Akio Izawa, Kawanishi; Hiroshi Noguchi, Nishinomiya, and Yasuko Eda, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Dec. 24, 1974, Ser. No. 536,181
Claims priority, application Japan, Dec. 27, 1973, 49-1799
Int. Cl.² C07D *499/70*
U.S. Cl. 260—239.1 25 Claims

1. A penicillin of the formula:





wherein

is a benzene ring or a pyridine ring, a pyrazine ring, a pyridazine ring, a pyrimidine ring, a pyrazole ring, a thiazole ring or an imidazole ring, R_4 is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkylthio, hydroxyl, di(lower)alkylamino or lower alkanoylamino

is pyridine ring, a pyrazine ring or a pyridazine ring, X is oxygen or sulfur, Y is hydrogen, lower alkoxycarbonyl or lower alkanoyl and R_1, R_2 and R_3 are each hydrogen, halogen, nitro, lower alkylamino, di(lower)alkylamino, amino, lower alkoxycarbonylamino, lower alkanoylamino, amino(lower)alkyl, lower alkyl, lower alkoxy, hydroxyl, sulfamoyl, trifluoromethyl, lower alkylthio or lower alkylsulfonyl, excluding the cases where all of R_1, R_2 and R_3 are hydrogen and where R_1 is hydroxyl and R_2 and R_3 are each hydrogen or halogen, and non-toxic pharmaceutically acceptable salts thereof.

3,992,372

PROCESSING POLYCAPROLACTAM EXTRACTION LIQUORS

Rudolph Hans Gath, Mannheim; Hugo Fuchs, Ludwigshafen; Ruediger Schmitz, Frankenthal; Klaus Kartte, Beindersheim, and Uwe Brand, Rosengarten, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 20, 1975, Ser. No. 560,313

Claims priority, application Germany, Apr. 2, 1974, 2415873

Int. Cl.² C07D *201/16*

U.S. Cl. 260—239.3 A **3 Claims**

1. A process for concentrating aqueous polycaprolactam extraction liquors by evaporation of water which comprises rearranging cyclohexanone oxime into caprolactam in oleum or sulfuric acid with liberation of heat, cooling of the rearrangement reaction mixture via indirect heat exchange with an aqueous polycaprolactam extraction liquor by absorbing heat from said rearrangement mixture, thereby raising the temperature of said liquor, feeding said heated liquor to an evaporator, also feeding to said evaporator a second aqueous polycaprolactam extraction liquor containing a lower polycaprolactam concentration than that of the heated liquor, and evaporating water from the composite of the two liquors in said evaporator.

3,992,373

PHOSPHOROTHIOAMIDES

Lindley A. Cates, Houston, Tex., assignor to Research Corporation, New York, N.Y.

Continuation of Ser. No. 180,509, Sept. 14, 1971, abandoned, which is a division of Ser. No. 852,945, Aug. 25, 1969, Pat. No. 3,660,413. This application Dec. 13, 1974, Ser. No. 532,376

Int. Cl.² C07F *9/56*

U.S. Cl. 260—239 EP **1 Claim**

1. $C_2H_5OPO(NHCHS)$ $[NHCSN(CH_2)_2]$.

3,992,374

AMINO-SUBSTITUTED NITROIMIDAZOLYL-METHYLENEAMINOIMIDAZOLIDINONES

Clemens Rufer, and Hans-Joachim Kessler, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed June 28, 1974, Ser. No. 484,067

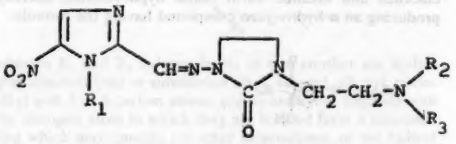
Claims priority, application Germany, July 7, 1973, 2335144

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07D *401/12, 401/14*

U.S. Cl. 260—240 A **8 Claims**

1. An amino-substituted nitroimidazolylmethylene-amino-imidazolidinone of the formula



wherein R_1 is alkyl of 1–4 carbon atoms and $—NR_2R_3$ is dialkylamino wherein alkyl is of 1 to 4 carbon atoms, pyrrolidino, piperidino, morpholino or N-methylpiperazino, or a physiologically acceptable acid addition thereof.

3,992,375

DIBENZOXAZEPINE N-CARBOXYLIC ACID HYDRAZINES AND DERIVATIVES

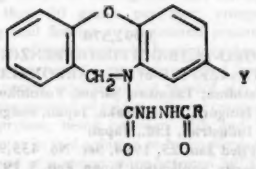
Richard A. Mueller, Glencoe, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 496,692, Aug. 12, 1974, Pat. No. 3,917,649, which is a continuation-in-part of Ser. Nos. 127,360, March 23, 1971, abandoned, and Ser. No. 329,407, Feb. 5, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,214

Int. Cl.² C07D *267/20*

U.S. Cl. 260—240 J **2 Claims**

1. A compound of the formula



wherein Y is selected from the group consisting of halogen and trifluoromethyl radicals, R is phenalkenyl having from 2–12 carbon atoms in the alkenyl portion.

3,992,376

PHENOTHIAZINE SULPHOXIMIDES

Peter Stoss, Wildtal; Gerhard Satzinger, Denzlingen, and Manfred Herrmann, St. Peter, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

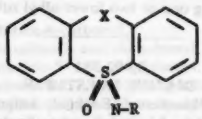
Filed Aug. 12, 1974, Ser. No. 496,618

Claims priority, application Germany, Apr. 8, 1974, 2417063

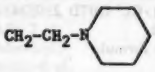
Int. Cl.[2] C07D *279/10*

U.S. Cl. 260—243 A 11 Claims

1. A tricyclic sulphoximide of the formula:



wherein X is N—CH_3, N—CO—CH_3, or N—H;
wherein R is CH_2—CH_2—$N(C_2H_5)_2$, CH_2—CH_2—CH_2—$N(CH_3)_2$,



CO—CH_2—CH_2—$N(C_2H_5)_2$, CO—O—C_2H_5, CO—NH—C_6H_{11}, CS—NH—CH_2—CH=CH_2, or CO—NH—SO_2—$C_6H_4CH_3$(p).

3,992,377

3-THIO-SUBSTITUTED CEPHALOSPORIN ANTIBIOTICS

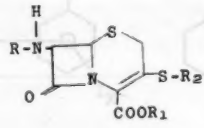
Robert R. Chauvette, and Gary A. Koppel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 13, 1974, Ser. No. 532,431

Int. Cl.[2] C07D *501/16*

U.S. Cl. 260—243 C 13 Claims

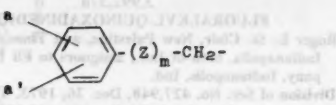
1. A cephalosporin compound of the formula



I

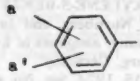
wherein R is hydrogen or an acyl group derived from a carboxylic acid and represented by the formula

wherein R′ is C_1–C_6 alkyl, C_1–C_3 haloalkyl, C_1–C_3 cyanoalkyl, phenyl, mono- or di-methylphenyl, mono- or di-hydroxyphenyl, mono- or di-halophenyl, mono- or di-nitrophenyl, mono- or di-aminophenyl, and mono- or di-methoxyphenyl;
or R′ is a group of the formula

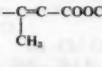


wherein *a* and *a′* independently are hydrogen, C_1–C_4 lower alkyl, C_1–C_4 lower alkoxy, halogen, hydroxy, nitro, amino, or carboxy;
Z is 0 or S; and
m is 0 or 1;
or R′ is a group of the formula

wherein P is 2-thienyl, 3-thienyl, phenyl or a substituted phenyl group of the formula



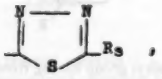
wherein *a* and *a′* are as defined above, Q is hydroxyl, formyloxy, acetoxy, carboxy, sulfo, amino, or amino protected by t-butyloxycarbonyl, 2,2,2-trichloroethoxycarbonyl, or the group of the formula

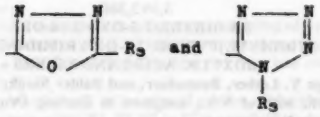


or R′ is a group of the formula

R″—CH_2—

wherein R″ is 2-thienyl, 3-thienyl, 2-furyl, [2-oxazyl, 2-thiazyl, or 1 tetrazyl] 2-oxazolyl, 2-thiazolyl, or 1-tetrazolyl;
R_1 is hydrogen, benzyl, 4-methoxybenzyl, 4-nitrobenzyl, diphenylmethyl, 2,2,2-trichloroethyl, or t-butyl;
R_2 is a heterocyclic ring selected from the group consisting of





wherein R_3 is C_1–C_3 lower alkyl;
and where R_1 is hydrogen, the pharmaceutically acceptable non-toxic salts thereof.

3,992,378

FLUORALKYL QUINOXADINEDIONES

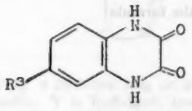
Roger L. St. Clair, New Palestine, and Thomas D. Thibault, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 427,948, Dec. 26, 1973. This application Nov. 14, 1975, Ser. No. 632,133

Int. Cl.² C07D *241/44*

U.S. Cl. 260—250 Q **4 Claims**

1. A compound selected from the group consisting of compounds of the formula



wherein R^3 represents fluoroalkyl of C_1–C_2, and the pharmaceutically acceptable alkali metal and alkaline earth metal salts.

3,992,379

4-ALKYLDIOXYALKYLENE-5-BENZYLPYRIMIDINES

Walter Otto Liebenow, Nurnberg, and Jaroslav Prikryl, Erlangen, both of Germany, assignors to Ludwig Heumann & Co. GmbH, Nuremberg, Germany

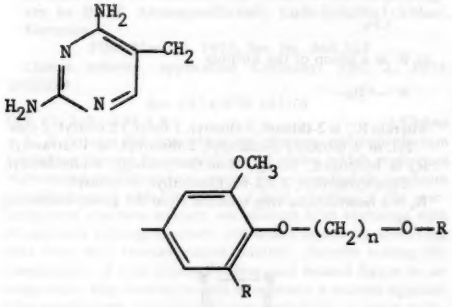
Filed Mar. 15, 1974, Ser. No. 451,595

Claims priority, application Germany, Mar. 17, 1973, 2313361

Int. Cl.² C07D *239/48*

U.S. Cl. 260—256.4 N **3 Claims**

1. A 2,4-diamino-5-(4′-alkyldioxyalkylene-benzyl)-pyrimidine having the formula



wherein R_1 is an alkyl group having from 1 to 3 carbon atoms, R is an alkoxy group having from 1 to 3 carbon atoms, and *n* is an integer of from 1 to 3, and pharmaceutically acceptable salts thereof.

3,992,380

5,8-DIHYDRO-5-OXO-2-(4-OR 3-PYRIDINYL)PYRIDO[2,3-D]PYRIMIDINE-6-CARBOXYLIC ACIDS AND ESTERS

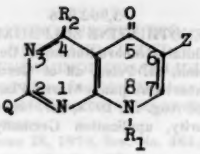
George Y. Lesher, Rensselaer, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 555,051

Int. Cl.² C07D *487/04*

U.S. Cl. 260—256.4 F **10 Claims**

1. 4-R_2-5,8-dihydro-8-(lower-alkyl)-5-oxo-2-Q-6-Z-pyrido[2,3-d]pyrimidine having the formula



where R_1 is lower-alkyl, Z is carboxy or lower-carbalkoxy, R_2 is hydrogen or lower-alkyl and Q is 4(or 3)-pyridinyl or 4(or 3)-pyridinyl having one or two lower-alkyl substituents.

3,992,381

DIAZINE DYESTUFFS

Allen Crabtree, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

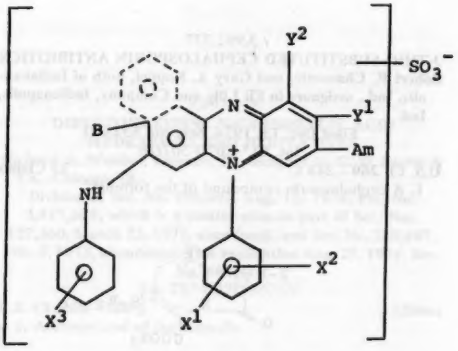
Continuation-in-part of Ser. No. 472,060, May 21, 1974, Pat. No. 3,951,974, which is a continuation-in-part of Ser. No. 323,359, Jan. 15, 1973, abandoned. This application May 2, 1975, Ser. No. 574,085

Claims priority, application United Kingdom, Feb. 11, 1972, 6499/72; Aug. 28, 1973, 40522/73; Mar. 20, 1974, 12294/74

Int. Cl.² G07D *239/24*

U.S. Cl. 260—256.5 R **4 Claims**

1. A dyestuff of the formula



wherein Am represents an anilino, di(C_{1-4} alkyl) amino, di(hydroxyethyl) amino, di(cyanoethyl)amino or N(C_{1-4} alkyl) benzylamino group; one of Y^1 and Y^2 is H or SO_3H and the

other is H or an alkyl or alkoxy group of 1–4 carbon atoms; one of X^1 or X^2 is H or SO_3H and the other is H, an alkyl group of 1–4 carbon atoms, an alkoxy group of 1–4 carbon atoms, Cl or CO_2H; X^3 is H, an alkyl group of 1–4 carbon atoms or SO_3H; when the dotted fused ring is present B is absent and when the dotted fused ring is absent B is H, an alkyl group of 1–4 carbon atoms or an alkoxy group of 1–4 carbon atoms; a NHQ group being present on the benzene nucleus bearing X^3 or on a benzene nucleus in the group Am when that group contains a benzene nucleus or two NHQ groups are present, one at each of the two said locations, wherein Q is a cellulose reactive group of the diazine series selected from the group consisting of

3:6-dichloropyridazine-4-carbonyl,
2:3-dichloro-quinoxaline-5- and -6-carbonyl,
2:3-dichloroquinoxaline-5- and -6-sulphonyl,
2:4:6-trichloro-quinazoline-7- and -8-sulphonyl,
2:4:7- and 2:4:8-trichloro-quinazoline-6-sulphonyl,
2:4-dichloro-quinazoline-6-carbonyl,
1:4-dichloro-phthalazine-6-carbonyl,
β-(4:5-dichloro-pyridazonyl-10)propionyl,
2:4-dichloroquinazoline-6- and 7-sulphonyl,
4-(4′:5′-dichloro-pyridaz-6′-on-1′-yl)benzoyl,
1-(4′:5′-dichloro-pyridaz-6′-on-1′-yl)phenylsulphonyl,
2:4-dichloro-pyrimidin-6-yl,
2:4-dibromo-pyrimidin-6-yl,
4:6-dichloro-pyrimidin-2-yl,
4:6-dibromo-pyrimidin-2-yl,
2:4:5-trichloropyrimidin-6-yl,
4:5:6-trichloropyrimidin-2-yl,
5-methyl-2:4-dichloropyrimidin-6-yl,
5-methyl-4:6-dichloropyrimidin-2-yl,
5-nitro-2:4-dichloropyrimidin-6-yl,
5-nitro-4:6-dichloropyrimidin-2-yl,
2-chloro-5-nitro-6-methyl-pyrimidin-4-yl,
4-chloro-5-nitro-6-methyl-pyrimidin-2-yl,
2-chloro-5-nitropyrimidin-4-yl,
4-chloro-5-nitropyrimidin-2-yl,
2:4-dichloro-5-cyanopyrimidin-6-yl,
4:6-dichloro-5-cyanopyrimidin-2-yl,
5-ethoxycarbonyl-2-chloro-pyrimidin-4-yl,
5-ethoxycarbonyl-4-chloro-pyrimidin-2-yl,
2:4-dichloropyrimidine-5-carbonyl,
5-dichloro-2-methylsulphonyl-6-methylpyrimidin-4-yl,
2,4-difluoro-5-chloropyrimidin-6-yl and
4,6-difluoro-5-chloropyrimidin-2-yl

and the dyestuff as a whole contains 2 to 5 sulphonic acid groups.

3,992,382

QUINOLYLAMINOBENZOYLPIPERAZINE-1-OXIDES

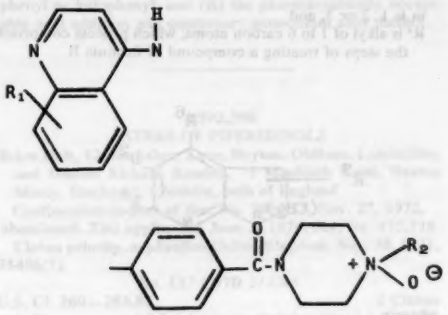
Charles E. Coverdale, Portage, and Louis L. Skaletzky, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 370,341, June 15, 1973, abandoned. This application Sept. 23, 1974, Ser. No. 508,790

Int. Cl.² C07D *295/16*

U.S. Cl. 260—268 BQ **5 Claims**

1. A compound of the formula:



hydrates thereof and pharmaceutically acceptable acid addition salts thereof wherein R_1 is halogen, lower alkyl, or trifluoromethyl; R_2 is selected from lower alkyl, benzyl, phenyl and phenyl substituted with one of the groups selected from halogen, lower alkyl, and trifluoromethyl.

3,992,383

PROCESS FOR PREPARING PYRIDINE DERIVATIVES

Adrian Charles Ward Curran, Newcastle-upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

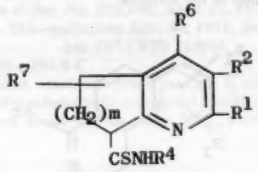
Filed Nov. 22, 1974, Ser. No. 526,354

Claims priority, application United Kingdom, Dec. 17, 1973, 58308/73

Int. Cl.² C07D *215/40, 219/08, 221/16*

U.S. Cl. 260—283 S **12 Claims**

1. A process for preparing a compound of formula I



and acid addition salts thereof, wherein

R^1, R^2 and R^6 are independently members selected from the group consisting of hydrogen, trifluoromethyl, alkyl of 1 to 6 carbon atoms, phenylalkyl in which the alkyl moiety has 1 to 6 carbon atoms and phenyl; or

R^1 and R^2 taken together are polymethylene of 3 to 5 carbon atoms;

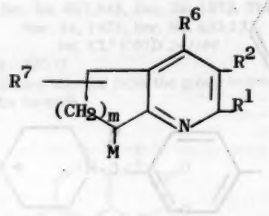
R^7 is a member selected from the group consisting of hydrogen, gem-dimethyl, alkyl of 1 to 6 carbon atoms, phenylalkyl in which the alkyl moiety has 1 to 6 carbon atoms, and phenyl;

in which the phenyl group or the phenyl portion of the phenylalkyl group representing R^1, R^2, R^6 or R^7 is unsubstituted or in monosubstituted by alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, halogen, nitro or trifluoromethyl;

with the proviso that when R^1 and R^2 or R^2 and R^6 are both alkyl, they are selected from normal and secondary alkyl groups;

m is 1, 2 or 3; and

R^4 is alkyl of 1 to 6 carbon atoms; which process comprises the steps of treating a compound of formula II



wherein

R^1, R^2, R^6, R^7 and m are as defined in connection with formula I above and M is sodium, potassium, lithium, or MgHal where Hal is chlorine, bromine or iodine, with an isothiocyanate of the formula R^4NCS wherein R^4 is as defined in connection with formula I;

treating the product with hydrogen ions.

3,992,384

SUBSTITUTED 1.2-DIHYDROBENZ[f]ISOQUINOLINE

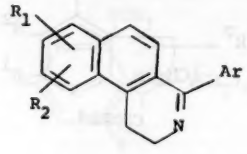
William J. Houlihan, Mountain Lakes, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 407,104, Oct. 17, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,685

Int. Cl.² C07D 221/10

U.S. Cl. 260—283 R 6 Claims

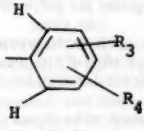
1. A compound of the formula:



where

R_1 and R_2 each independently represent hydrogen or lower alkoxy having 1 to 4 carbon atoms,

Ar is



and

R_3 and R_4 are each independently hydrogen, fluorine or chlorine

provided that at least one of R_3 and R_4 is fluorine or chlorine or a pharmaceutically acceptable acid addition salt thereof.

3,992,385

2,3-DIHYDROERGOLINES

Nicholas J. Bach, and Edmund C. Kornfeld, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jan. 20, 1975, Ser. No. 542,142

Int. Cl.² C07D 457/02

U.S. Cl. 260—285.5 3 Claims

1. D-2,3-dihydro-6-methyl-8-hydroxymethyl-12, 14-dibromo-ergoline.

2. D-1-acetyl-2,3-dihydro-6-methyl-8-acetoxymethyl-ergoline.

3. D-1-acetyl-2,3-dihydro-6-methyl-8-acetoxymethyl-12-nitro-ergoline.

3,992,386

4(QUINOLYL)PHENOXY ALKANOIC ACID DERIVATIVES

Erich Schacht; Werner Mehrhof; Herbert Nowak; Zdenek Simane, and Detlev Kayser, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

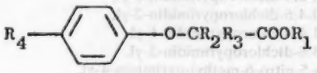
Filed Mar. 8, 1974, Ser. No. 449,332

Claims priority, application Germany, Mar. 13, 1973, 2312344; Apr. 18, 1973, 2319642; May 18, 1973, 2325184

Int. Cl.² C07D 215/06, 215/14

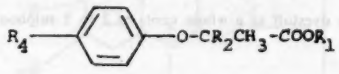
U.S. Cl. 260—287 CE 20 Claims

1. A compound of the formula



wherein R_1 is H or alkyl of 1–4 carbon atoms, R_2 is H, or when R_4 is Q, H or alkyl of 1–4 carbon atoms, R_3 is phenyl or chlorophenyl and R_4 is 1,2,3,4-tetrahydroquinolino, 1-R_5-1,2,3,4-tetrahydro-4-quinolyl or Q, wherein R_5 is H or alkyl of 1–4 carbon atoms and Q is 4-oxo-1,2,3,4-tetrahydroquinolino, 4-hydroxy-1,2,3,4-tetrahydroquinolino, or 1-phenyl-1,2,3,4-tetrahydro-4-quinolyl, and the physiologically acceptable salts thereof.

17. A compound of the formula



wherein R_1 and R_2 each are H or alkyl of 1–4 carbon atoms and R_4 is 4-hydroxy- or 4-oxo-1,2,3,4-tetrahydroquinolino, and the physiologically acceptable salts thereof.

3,992,387

OCTAHYDROPYRINDINE PHOSPHORYLACYLAMINES

Elmar Sturm, Aesch, Switzerland, and Hans Jörg Cellarius, deceased, late of Riehen, Switzerland (by Herta Cellarius-Haigermoser, legal representative), assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 324,469, Jan. 17, 1973, Pat. No. 3,876,643. This application Jan. 30, 1975, Ser. No. 545,464

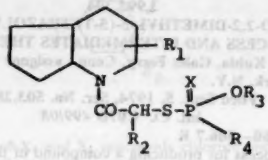
Claims priority, application Switzerland, Jan. 20, 1972, 910/72

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C07F 9/165, 9/40

U.S. Cl. 260—293.54 9 Claims

1. A phosphorylacylamine compound of the formula



wherein each of R_1 and R_2 is hydrogen or methyl; R_3 is alkyl of from 1 to 4 carbon atoms; R_4 is alkyl, alkoxy or alkylthio of from 1 to 4 carbon atoms; and X is oxygen or sulphur.

3,992,388

4-(2-PYRIDYLAMIDOETHYL)PIPERIDINES

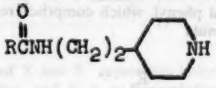
Wayne E. Barth, East Lyme, and Donald E. Kuhla, Gales Ferry, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 504,826, Sept. 10, 1974, Pat. No. 3,933,830. This application Oct. 17, 1975, Ser. No. 623,351

Int. Cl.² C07D *213/56*

U.S. Cl. 260—293.69 **2 Claims**

1. A 4-(2-pyridylamidoethyl)piperidine of the formula



wherein R is selected from the group consisting of 3-(2-methoxy)pyridyl, 3-(2-ethoxy)pyridyl and 2-(4-chloro)pyridyl.

3,992,389

HETEROCYCLIC COMPOUNDS

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

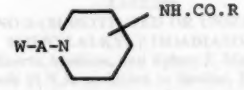
Continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Apr. 2, 1975, Ser. No. 564,509

Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71; Sept. 1, 1972, 40618/72; Dec. 21, 1972, 59141/72; Dec. 21, 1972, 59142/72; Dec. 21, 1972, 59143/72; Dec. 21, 1972, 59144/72

Int. Cl.² C07D *211/58*

U.S. Cl. 260—293.76 **19 Claims**

1. A compound selected from the group consisting of (A) heterocyclic compounds of the formula



in which W represents a member of the group consisting of phenyl, monohalophenyl, dihalophenyl, lower alkoxyphenyl, lower alkyl phenyl, di-(lower alkyl)phenyl, hydroxyphenyl, dihydroxyphenyl and acetylaminophenyl, A represents a bivalent radical selected from the group consisting of mono-keto lower alkylene, hydroxy lower alkylene, and radicals having the formula $-OCH_2CHOHCH_2-$ or O-lower alkylene; R represents a member of the group consisting of phenyl, chlorophenyl and cyclohexyl and the term "lower" means that the radical contains from 1 to 6 carbon atoms or W—A represents $Ar_2CHCH_2(CH_2)_n-$ where *n* denotes 1 to 4 and Ar represents phenyl or halophenyl; and (B) the pharmaceutically acceptable acid addition and quaternary ammonium salts thereof.

3,992,390

ESTERS OF PIPERIDINOLS

Brian Holt, 12 Blackshaw Lane, Royton, Oldham, Lancashire, and Donald Richard Randell, 75 Maukdeth Road, Heaton Mercy, Stockport, Cheshire, both of England

Continuation-in-part of Ser. No. 309,853, Nov. 27, 1972, abandoned. This application June 3, 1974, Ser. No. 475,718

Claims priority, application United Kingdom, Nov. 30, 1971, 55486/71

Int. Cl.² C07D *211/46*

U.S. Cl. 260—293.82 **2 Claims**

1. The compound 2,2,6,6-tetramethylpiperidinyl-4-3',5'-di-t-butyl- 4'-hydroxybenzoate.

3,992,391

1,3-DISUBSTITUTED THIOUREA COMPOUNDS AND PREPARATION THEREOF

Hitoshi Uno, Takatsuki; Junji Nakano, Osaka, and Toshiaki Kadokawa, Hirakata, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Japan

Filed Aug. 16, 1972, Ser. No. 280,953

The portion of the term of this patent subsequent to Mar. 16, 1992, has been disclaimed.

Int. Cl.² C07D *213/74*

U.S. Cl. 260—294.8 H **3 Claims**

1. 1-(3'-Pyridyl)-3-(1',1'-dimethyl-2'hydroxyethyl)thiourea or its pharmaceutically acceptable acid addition salt.

3,992,392

SYNTHESIS OF INDOLES FROM ANILINES AND INTERMEDIATES THEREIN

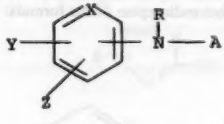
Paul G. Gassman, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Colombus, Ohio

Division of Ser. No. 355,198, April 27, 1973, Pat. No. 3,901,899. This application Apr. 30, 1975, Ser. No. 573,069

Int. Cl.² C07D *213/36*

U.S. Cl. 260—294.8 C **21 Claims**

1. A process which comprises reacting in an organic liquid solvent, under substantially anhydrous conditions at a temperature of from about −78° to about 20° C, a compound of the formula



(I)

wherein

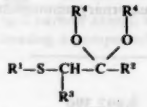
X is —CH= or —N=;

R is hydrogen or a hydrocarbon radical free of aliphatic unsaturation and containing from 1 to 8 carbon atoms;

A is chlorine or bromine;

each of Y and Z is hydrogen or a substituent which does not donate electrons any more strongly than m-methoxy, m-hydroxy, or p-acetoxy, and not more than one of Y and Z is ortho to the -N (R)A group position on the ring;

the -N (R)A group position on the ring having at least one ring carbon atom ortho thereto in an unsubstituted state; with a sulfide compound having the formula



(III)

wherein

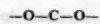
R^1 is lower alkyl, or phenyl;

R^2 is hydrogen, lower alkyl, or phenyl;

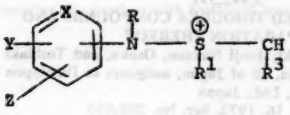
R^3 is hydrogen, lower alkyl, phenyl or benzyl;

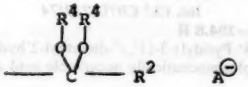
R^2 can be attached to R^3 as part of a cyclic ring system containing 5 to 8 carbon atoms;

each R^4 is lower alkyl or the two R^4 radicals are taken together with the



moiety to complete a cyclic ketal or acetal containing from 3 to 4 carbon atoms in the ring, for a time sufficient to form an azasulfonium salt having the formula





(V)

wherein X, Y, Z, R, R^1, R^2, R^3, each R^4 and A are as defined above.

3,992,393

NOVEL IMIDAZOBENZODIAZEPINE DERIVATIVE

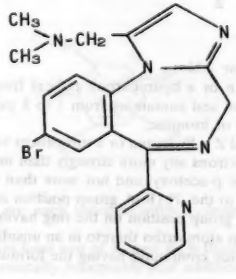
Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 20, 1975, Ser. No. 623,970

Int. Cl.² C07D *487/04*

U.S. Cl. 260—296 T **1 Claim**

1. 8-Bromo-1-[(dimethylamino)methyl]-6-(2-pyridyl)4H-imidazo [1,2-a][1,4]benzodiazepine of the formula:



3,992,394

6-AMINO-2,2-DIMETHYL-3-(5-TETRAZOLYL)PENAM PROCESS AND INTERMEDIATES THEREFOR

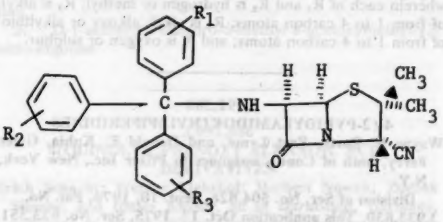
Donald E. Kuhla, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Sept. 5, 1974, Ser. No. 503,281

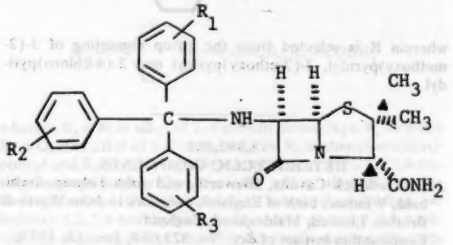
Int. Cl.² C07D *499/08*

U.S. Cl. 260—306.7 R **3 Claims**

1. A process for producing a compound of the formula



wherein each of R_1, R_2 and R_3 is selected from the group consisting of hydrogen, chloro, bromo, fluoro, alkyl having from one to four carbon atons, alkoxy having from one to four carbon atoms and phenyl, which comprises reacting a compound of the formula



with a dehydrating agent selected from the group consisting of phosphorous pentachloride and phosgene, each in the presence of pyridine.

3,992,395

PROCESS FOR THE PREPARATION OF CHLORINATED PHENYLHYDROXYLAMINES

Joel Le Ludec, Rhone, France, assignor to Rhone-Poulenc S.A., Paris, France

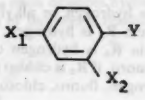
Filed Nov. 25, 1974, Ser. No. 527,042

Claims priority, application France, Nov. 26, 1973, 73.42008

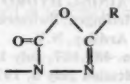
Int. Cl.² C07D *271/10*

U.S. Cl. 260—307 A **14 Claims**

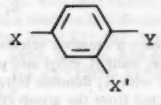
1. Process for the preparation of a chlorinated phenylhydroxylamine of the formula:



wherein one of X_1 and X_2 represents chlorine and the other represents hydroxylamino, and Y represents chlorine or a dihydrooxadiazolyl group of the formula:

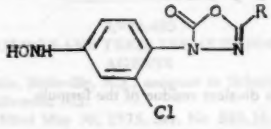


wherein R represents alkyl of 1 through 4 carbon atoms, which consists essentially of the hydrogenation, at between 0° and 100° C and under a hydrogen pressure of 1 to 50 atmospheres in the presence of a catalyst consisting of platinum, palladium, rhodium, ruthenium or nickel, of a nitrophenyl compound of the formula:



wherein one of X and X′ represents chlorine and the other represents nitro, and Y is as hereinbefore defined, in the presence of, as the sole diluent, aniline, n-cyclopentyl or cyclohexyl aniline, N-Alkylated Anilines, Anilines alkylated on at least one the carbon atoms of the ring, pyridine, alkylated pyridines, quinoline or isoquinoline, the alkyls of the said alkylated anilines and pyridines having 1 through 4 carbon atoms the ratio by weight of the said organic base to the nitrophenyl compound being greater than 0.1, and the proportion by weight of the said catalyst being between 0.001 and 1% by weight of the nitrophenyl phenyl compound initially present when a precious metal catalyst is used and between 0.5 and 20% by weight of the nitrophenyl compound when a nickel catalyst is used.

4. A 1,3,4-oxadiazolinone of the formula:



wherein R represents alkyl of 1 through 4 carbon atoms.

3,992,396

2-AMINO-5-(SUBSTITUTED OR UNSUBSTITUTED PHENYLALKYL)-THIADIAZOLES

Marcel K. Eberle, Madison, and Robert E. Manning, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 485,991, July 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 452,678, March 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 218,559, Jan. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 124,489, March 15, 1971, abandoned. This application Nov. 29, 1974, Ser. No. 528,476

Int. Cl.² C07D *285/12*

U.S. Cl. 260—306.8 D **18 Claims**

1. The compound which is 2-amino-5-(4-[phenylbutyl])-thiadiazole.

8. The compound which is 2-amino-5-(2,6-dichlorobenzyl)-thiadiazole.

15. The compound which is 2-amino-5-(4-[p-chlorophenyl]butyl)-thiadiazole.

3,992,397

(1-ALKYL-5-NITRO-IMIDAZOLYL-2-ALKYL)-HETEROARYL COMPOUNDS AND PROCESS FOR THEIR MANUFACTURE

Erhardt Winkelmann, Kelkheim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 12, 1974, Ser. No. 532,005

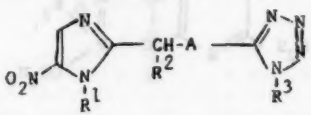
Claims priority, application Germany, Dec. 14, 1973, 2362171

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07D *257/04*

U.S. Cl. 260—308 D **4 Claims**

1. A (1-alkyl-5-nitro-imidazolyl-2-alkyl)-heteroaryl sulfide, sulfoxide or sulfone of the formula



in which R^1 stands for methyl or ethyl, R^2 stands for hydrogen or methyl, R^3 stands for hydrogen, alkyl of 1 to 4 carbon atoms, phenyl, tolyl or chlorophenyl, and A stands for sulfur (—S—), sulfoxide (—SO—) or sulfone ($—SO_2—$)

3,992,398

PROCESS FOR THE PRODUCTION OF 1,2,4-TRIAZOLE DERIVATIVES

Beat Böhner, Binningen; Dag Dawes, Muttenz; Willy Meyer, Riehen, all of Switzerland; Jean Perchais, Rixheim, France, and Hanspeter Fischer, Bottmingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

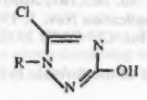
Filed June 3, 1975, Ser. No. 583,377

Claims priority, application Switzerland, June 13, 1974, 8088/74; Dec. 6, 1974, 16244/74

Int. Cl.² C07D *249/12*

U.S. Cl. 260—308 R **12 Claims**

1. Process for the production of 1-alkyl-3-hydroxy-5-chloro-1,2,4-triazoles of formula I



(I)

wherein

R represents a straight-chain or branched-chain alkyl group having 1 to 5 carbon atoms,

in which process an alkylhydrazine of formula II

$$R - NH - NH_2 \qquad (II)$$

wherein R has the meaning given under formula I, or a salt of such an alkylhydrazine, is firstly reacted, in the presence of an acid-binding agent, with cyanogen chloride to the corresponding 1-alkyl-1-cyanohydrazine, and this is subsequently cyclized with phosgene to a 1-alkyl-3-hydroxy-5-chloro-1,2,4-triazole of formula I.

3,992,399
1,2,4-TRIAZOLYL-PHOSPHORIC AND -PHOSPHONIC ACID ESTERS

Beat Böhner, Binningen; Dag Dawes, Pratteln, and Willy Meyer, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 5, 1973, Ser. No. 422,038

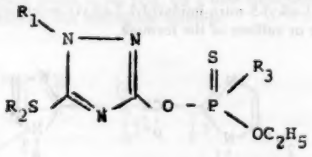
Claims priority, application Switzerland, Dec. 8, 1972, 17896/72; Nov. 2, 1973, 15458/73

The portion of the term of this patent subsequent to Feb. 18, 1992, has been disclaimed.

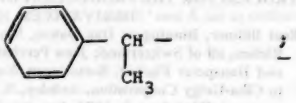
Int. Cl.² C07F 9/65

U.S. Cl. 260—308 R **19 Claims**

1. A compound of the formula



wherein R_1 represents alkyl with 1 to 3 carbon atoms or cyclopentyl; R_2 represents diphenylmethyl, represents benzyl in which the phenyl group is substituted by one fluoro, bromo, nitro or up to three chloro radicals, or represents



and R_3 represents ethoxy or propylthio.

3,992,400
1-(α-PHENYL-O-TOLYL)IMIDAZOLES

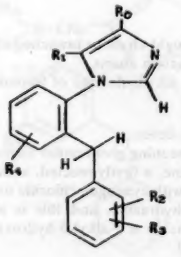
Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 565,107, April 4, 1974, Pat. No. 3,941,802. This application Nov. 3, 1975, Ser. No. 628,571

Int. Cl.² C07D 233/56

U.S. Cl. 260—309 **12 Claims**

1. The compound of the formula IV:



IV

wherein R_6 and R_1 are hydrogen or alkyl of 1 to 3 carbon atoms, inclusive; wherein R_2 is hydrogen, fluoro, chloro, or trifluoromethyl; wherein R_3 is hydrogen or fluoro with the proviso that R_3 is not fluoro, if R_2 is chloro or trifluoromethyl; and wherein R_4 is hydrogen, fluoro, chloro, bromo, trifluoromethyl or nitro.

3,992,401
BIS-(HYDANTOINYL)BENZIMIDAZOLENE COMPOUNDS CONTAINING HYDROXYALKYL GROUPS

Jurgen Habermeier, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

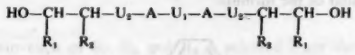
Division of Ser. No. 487,107, July 10, 1974, Pat. No. 3,928,377. This application July 8, 1975, Ser. No. 594,169

Claims priority, application Switzerland, July 30, 1973, 11053/73

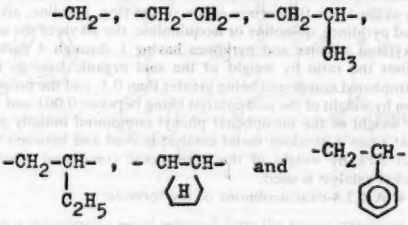
Int. Cl.² C07D 403/14

U.S. Cl. 260—309.2 **3 Claims**

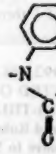
1. A di-(hydroxyalkyl) compound of the formula



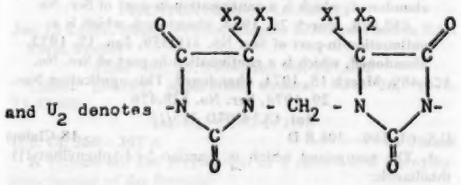
wherein each R_1 denotes a member selected from the group consisting of hydrogen, methyl, ethyl and phenyl, R_2 denotes hydrogen or together with R_1 denotes tetramethylene, A denotes a member selected from the group consisting of a divalent residue of the formulae



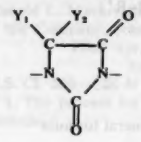
U_1 denotes a divalent residue of the formula



and U_2 denotes



wherein X_1 and X_2 each denotes hydrogen or an alkyl with 1 to 4 carbon atoms or denotes a residue of the formula



wherein Y_1 and Y_2 each denotes hydrogen, an alkyl with 1–4 carbon atoms or phenyl or together denote pentamethylene.

3,992,402

HERBICIDAL AND/OR FUNGICIDAL 5-POLYHALOETHYLIMINO- AND 5-POLYHALOVINYLIMINO-2,4-IMIDAZOLIDINEDIONES

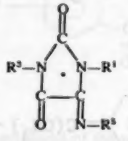
Malcolm S. Singer, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 455,167, March 27, 1974, Pat. No. 3,925,553, which is a continuation-in-part of Ser. No. 239,357, March 29, 1972, Pat. No. 3,822,282. This application Aug. 29, 1975, Ser. No. 608,856

Int. Cl.² C07D *233/88*

U.S. Cl. 260—309.5 **7 Claims**

1. Compound of the formula



wherein one R^1 or R^3 group is alkyl of 1 to 6 carbon atoms and the other R^1 or R^3 group is alkenyl of 3 to 6 carbon atoms or naphthyl; and R^5 is 1-hydroxy-2,2,2-trihaloethyl, 1,2,2,2-tetrahaloethyl trihalovinyl or dihalovinyl wherein the halogen is of atomic number 17 to 35.

3,992,403

2-IMIDAZOLINES AND THEIR USE AS HYPOGLYCEMIC AGENTS

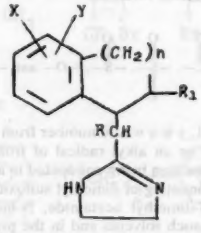
Heide Roebke, Belleville, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed May 30, 1975, Ser. No. 582,313

Int. Cl.² C07D *49/34*

U.S. Cl. 260—309.6 **11 Claims**

1. A compound of the structural formula:



and the pharmaceutically acceptable acid addition salts thereof, wherein each of X and Y are hydrogen or fluoro, each of R and R_1 are lower alkyl or hydrogen, and *n* is an integer 1 to 3.

3,992,404

PYRAZOL-5-ONES

Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

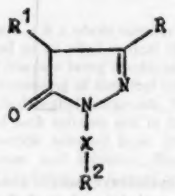
Division of Ser. No. 461,285, April 15, 1975, Pat. No. 3,952,008. This application May 19, 1975, Ser. No. 578,516

Claims priority, application Germany, Apr. 17, 1973, 2319279; Dec. 19, 1973, 2363138

Int. Cl.² C07D *231/20, 231/38, 231/52*

U.S. Cl. 260—310 A **11 Claims**

1. A compound of the formula



I

or a pharmaceutically acceptable, nontoxic salt thereof, wherein

R is amino;

R^1 is monoaryl unsubstituted or substituted by lower alkoxy or aralkyl wherein the aryl moiety is a monoaryl moiety and the alkyl moiety is a lower alkyl moiety, said aralkyl being unsubstituted or substituted by lower alkoxy;

X is

a. ethylene, ethylene wherein 1 hydrogen atom on one of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms or ethylene wherein 1 hydrogen atom on each of the two carbon atoms is substituted by alkyl of 1 to 4 carbon atoms;

b. propenyl or propenyl wherein 1 hydrogen atom on one, two or three of the carbon atoms is substituted by alkyl of 1 to 4 carbon atoms; or

c. methylene;

R^2 is aryl of 6 to 10 carbon atoms unsubstituted or substituted by:

a. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 8 carbon atoms and lower alkoxy;

b. cycloalkyl of 5, 6 or 7 carbon atoms or cycloalkenyl of 5, 6 or 7 carbon atoms;

c. nitro; or

d. nitro and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen and trifluoromethyl.

3,992,405

CATIONIC DYESTUFFS

Alfred Brack, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 28, 1972, Ser. No. 276,026

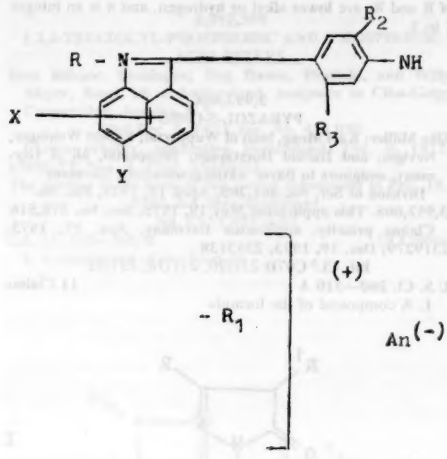
Claims priority, application Germany, July 29, 1971, 2138029

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C07D *209/60*

U.S. Cl. 260—326.5 B **10 Claims**

1. Cationic dyestuff having the formula



wherein

R is C_1-C_6-alkyl; cyclohexyl; benzyl; phenylethyl; phenylpropyl; phenyl; methylphenyl; methylbenzyl; allyl; ethyl substituted by nitrile, chloro, C_1-C_4-alkoxy, carboxy or C_1-C_4-alkoxycarbonyl; C_1-C_4-alkoxycarbonylmethyl; or trimethylene bonded to the naphthalene ring in the β-position;

R_1 is C_1-C_6-alkyl; cyclohexyl; benzyl; methylbenzyl; phenylethyl; allyl; or ethyl substituted by nitrile, hydroxy, C_1-C_4-alkoxy chloro or C_1-C_4-alkoxycarbonyl;

R_2 is hydroxyl; C_1-C_3-alkyl; C_1-C_4-alkoxy; benzyl; or benzyloxy;

R_3 is hydrogen; chloro; hydroxyl; methyl; C_1-C_4-alkoxy; methoxycarbonylamino; or dimethylaminocarbonylamino;

X is hydrogen; chloro; bromo; hydroxyl; ethyl; methoxy; ethoxy; acetylamino; methylamino; dimethylamino; methylsulfonylamino; amidosulfonyl; dimethylaminosulfonyl; nitrile; or methylmercapto;

Y is hydrogen; chloro; or bromo.

3,992,406

PREPARATION OF AROMATIC BISIMIDES

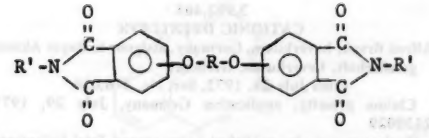
Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,993

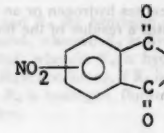
Int. Cl.² C07D *209/48*

U.S. Cl. 260—326 N **8 Claims**

1. The process for making aromatic imides of the general formula



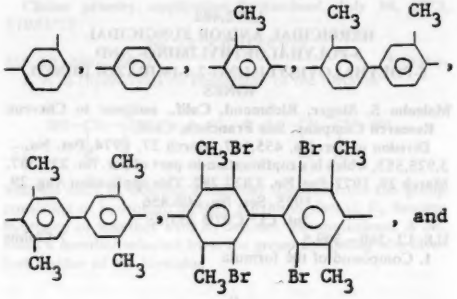
which comprises (1) effecting reaction under substantially anhydrous conditions between a nitrophthalimide of the general formula



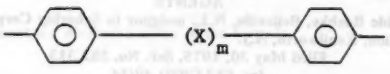
with a dihydroxy compound of the general formula

HO-R-OH

where R is a member selected from the class consisting of (a) divalent radicals of the formula



and (b) divalent organic radicals of the general formula



where X is a member selected from the class consisting of divalent radicals of the formulas

where *m* is 0 or 1, *y* is a whole number from 1 to 5, and R′ is a phenyl radical or an alkyl radical of from 1 to 2 carbon atoms, the said reaction being conducted in a solvent selected from the class consisting of dimethyl sulfoxide, N,N-dimethyl formamide, N,N-dimethyl acetamide, N-methylpyrrolidone, and mixtures of such solvents and in the presence of a solid alkali-metal fluoride selected from the class consisting of cesium, potassium and rubidium fluorides, and mixtures thereof, and (2) isolating the formed aromatic bisimide.

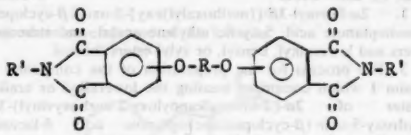
3,992,407

PREPARATION OF AROMATIC BISIMIDES

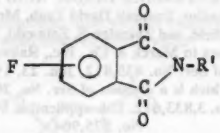
Ronald L. Markezich, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,992
Int. Cl.² C07D 209/48
U.S. Cl. 260—326 N 8 Claims

1. The process for making aromatic imides of the general formula



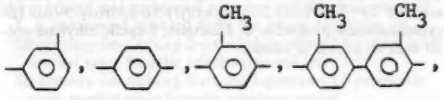
which comprises (1) effectin reaction under substantially anhydrous conditions between a fluorophthalimide of the general formula

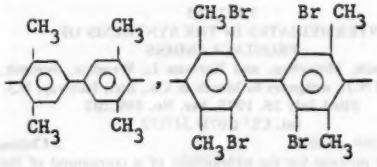


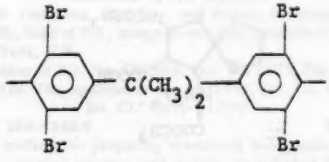
with a dihydroxy compound of the general formula

HO-R-OH

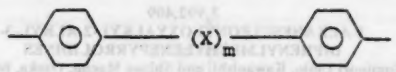
where R is a member selected from the class consisting of (a) divalent radicals of the formula







and (b) divalent organic radicals of the general formula



where X is a member selected from the class consisting of divalent radicals of the formulas

where m is 0 or 1, y is a whole number from 1 to 5, and R′ is a phenyl radical or an alkyl radical of from 1 to 2 carbon atoms, the said reaction being conducted in a solvent selected from the class consisting of dimethyl sulfoxide, N,N-dimethyl formamide, N,N-dimethyl acetamide, N-methyl-pyrrolidone, and mixtures of such solvents and in the presence of a solid alkali-metal fluoride selected from the class consisting of cesium, potassium and rubidium fluorides, and mixtures thereof, and (2) isolating the formed aromatic bisimide.

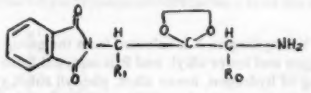
3,992,408

PHTHALIMIDO ALKANONE, ETHYLENE KETALS

Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

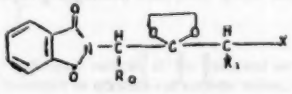
Division of Ser. No. 505,342, Sept. 12, 1974, Pat. No. 3,910,946. This application Aug. 6, 1975, Ser. No. 602,322
Int. Cl.² C07D 209/48
U.S. Cl. 260—326 N 4 Claims

1. A compound of the formula



wherein R_o and R_1 are hydrogen, methyl or ethyl.

2. A compound of the formula:



wherein X is bromo, chloro, N_3, or

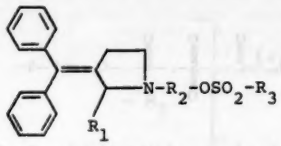
and wherein R_o and R_1 are hydrogen, methyl, or ethyl.

3,992,409
1-ALKANESULFONYLOXYALKYL-2-ALKYL-3-DIPHENYLMETHYLENEPYRROLIDINES

Suminori Umio, Kawanishi, and Shizuo Maeno, Osaka, both of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed June 18, 1975, Ser. No. 587,855
Int. Cl.² C07D 207/20
U.S. Cl. 260—326.82 3 Claims

1. A compound of the formula



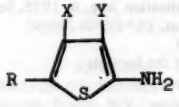
wherein R_1 and R_3 are each alkyl of 1–6 carbons and R_2 is alkylene of 1–6 carbons, and a non-toxic, pharmaceutically acceptable acid addition salt thereof.

3,992,410
PROCESS FOR MANUFACTURING THIOPHENE DERIVATIVES

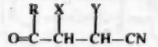
David Boyd Baird; Brian Ribbons Fishwick; Ian Knowles Barben, all of Manchester, England, and John Murray Holland, deceased, late of Bury, England (by Susan Holland, sole administratrix), assignors to Imperial Chemical Industries Limited, London, England

Filed June 4, 1975, Ser. No. 583,764
Claims priority, application United Kingdom, June 11, 1974, 25847/74
Int. Cl.² C07D 333/00
U.S. Cl. 260—329 S 3 Claims

1. A process for the manufacture of a salt of a 2-aminothiophene of the formula:



wherein Y is hydrogen, X is selected from the group consisting of hydrogen and lower alkyl, and R is selected from the group consisting of hydrogen, lower alkyl, phenyl, tolyl, xylyl, chlorophenyl, bromophenyl, dichlorophenyl, nitrophenyl, cyanophenyl, lower alkylsulphonylphenyl and ethoxycarbonylphenyl, thienyl and furyl, or X and Y together comprise a chain of methylene groups to form a 5- or 6-membered fused ring system, which comprises treating a compound of the formula:



I

with hydrogen sulphide in the presence of an acid selected from the group consisting of hydrogen chloride, hydrogen bromide, sulfuric acid and benzene sulphonic acid, in an amount of at least one mole of said acid per mole of formula I to form said salt and in an organic solvent medium at a temperature between −20° C and the boiling point of the reaction mixture.

3,992,411
2α-FORMYL-3β-[(METHOXALYL)OXY]-5-OXO-1β-CYCLOPENTANEHEPTANOIC ACID AND PROCESS

Norman L. Wendler, Summit; David Taub, Metuchen; Harry L. Slates, Westfield, and Zbigniew S. Zelawski, Piscataway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 435,812, Jan. 23, 1974, Pat. No. 3,915,994, which is a division of Ser. No. 201,979, Nov. 24, 1971, Pat. No. 3,833,612. This application May 8, 1975, Ser. No. 575,762
Int. Cl.² C07D 317/72
U.S. Cl. 260—340.9 3 Claims

1. 2α-Formyl-3β-[(methoxalyl)oxy]-5-oxo-1β-cyclopentaneheptanoic acid, 5-cyclic ethylene acetal, and stereoisomers and loweralkyl, benzyl, or xylyl esters thereof.

3. The process for the preparation of the compound of claim 1 which comprises treating the loweralkyl or aralkylester of 2α-(2-loweralkanoyloxy-2-carboxyvinyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid δ-lactone, 5-cyclic ethylene acetal with osmium tetroxide in the presence of an alkali metal periodate.

3,992,412
2α-(2-CARBOXY-2-OXOETHYL)-3β-HYDROXY-5-OXO-1β-CYCLOPENTANEHEPTANOIC ACID AND PROCESS

Norman L. Wendler, Summit; David Taub, Metuchen; Harry L. Slates, Westfield, and Zbigniew S. Zelawski, Piscataway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 435,812, Jan. 23, 1974, Pat. No. 3,915,994, which is a division of Ser. No. 201,979, Nov. 24, 1971, Pat. No. 3,833,612. This application May 8, 1975, Ser. No. 575,904
Int. Cl.² C07D 317/72
U.S. Cl. 260—340.9 3 Claims

1. 2α-(2-Carboxy-2-oxoethyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid, δ-lactone, 5-cyclic ethylene acetal and stereoisomers and loweralkyl, benzyl, or xylyl esters thereof.

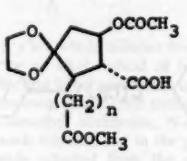
3. The process for the preparation of the compound of claim 1 which comprises treating the loweralkyl or aralkyl ester of 2α-(2-carboxy-2-formylethyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid, δ-lactone, 5-cyclic ethylene acetal with an excess of ozone.

3,992,413
INTERMEDIATES IN THE SYNTHESIS OF PROSTAGLANDINS

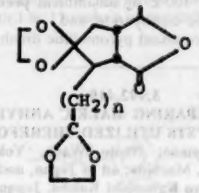
David Taub, Metuchen, and Norman L. Wendler, Summit, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed July 25, 1975, Ser. No. 599,202
Int. Cl.² C07D 317/72
U.S. Cl. 260—340.9 3 Claims

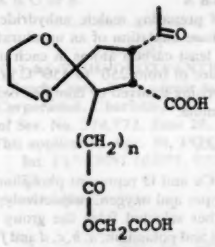
1. The process for the production of a compound of the formula



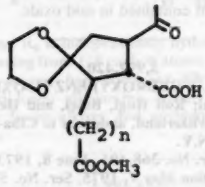
wherein *n* is 1 or 2 which comprises oxidizing a compound of the formula



to produce a compound of the formula



contacting said compound with sodium methoxide in methanol to produce a monoester of the formula



and oxidizing said monoester with peroxytrifluoroacetic acid.

2. A compound selected from the group consisting of:

3β-acetoxy-2α-carboxy-5-oxocyclopentane-1β-acetic acid, methyl ester 5-cyclic ethylene acetal; or

3β-acetoxy-2α-carboxy-5-oxocyclopentane-1β-propionic acid, methyl ester 5-cyclic ethylene acetal.

3,992,414

PROCESS FOR THE PREPARATION OF SELECTIVELY HALOGENATED KETALS

Eddie N. Gutierrez, Fort Lee, and Robert C. Reardon, Jr., Tenafly, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 426,855, Dec. 20, 1973, Pat. No. 3,919,328. This application Aug. 1, 1975, Ser. No. 601,105

Int. Cl.² C07D 317/10

U.S. Cl. 260—340.9 **8 Claims**

1. A method for preparing selectively halogenated ketals which comprises treating with a halogen selected from the group consisting of chlorine and bromine ether compounds of the formula:

wherein R_1 is a straight chain unsubstituted alkyl group of from 1 to 20 carbon atoms, and R_2 and R_3 are straight chain unsubstituted alkyl groups of from 1 to 10 carbon atoms; said treatment being in a polyhydric alcohol selected from the group consisting of ethylene glycol and 2,3-butanediol wherein the ratio of said alcohol to said ether is from about 5:1 to about 20:1 and at a temperature of from about 0° C to about 80° C.

3,992,415

METHOD OF PREPARING HALOGENATED LACTONE

William A. Erby, Alburtis, and Robert A. Walde, Emmaus, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation of Ser. No. 284,815, Aug. 30, 1972, Pat. No. 3,862,220, which is a continuation of Ser. No. 714,761, March 21, 1968, abandoned, which is a continuation-in-part of Ser. No. 541,096, April 8, 1966, Pat. No. 3,577,546. This application Aug. 19, 1974, Ser. No. 498,808

The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.

Int. Cl.² C07D 309/32

U.S. Cl. 260—343.6 **2 Claims**

1. A method for producing 2,3,4,5,5,5-hexachloro-2-pentenoyl-4-lactone which comprises treating levulinic acid or an ester thereof with elemental chlorine initially at substantially ambient temperature and raising the temperature to about 212° C. and continuing the chlorination in the range of about 212° to about 260° C. until cyclization occurs and sufficient chlorine has been added to yield the desired product.

3,992,416

4-OXA-5-HYDROXYPOLYCYCLOALKENONES-(3)

Gerhard Bolz, Frankenthal, and Walter-Wielant Wierdsdorff, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

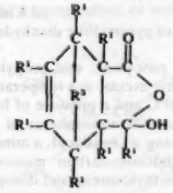
Filed Sept. 9, 1974, Ser. No. 504,491

Claims priority, application Germany, Sept. 14, 1973, 2346304

Int. Cl.² C07D 307/83

U.S. Cl. 260—343.3 R **7 Claims**

1. A 4-oxa-5-hydroxypolycycloalkenone-(3) of the formula:



in which the individual radicals R^1 are identical or different and each is hydrogen or alkyl of 1–8 carbon atoms, and R^3 is alkylene of 2 to 4 carbon atoms, alkenylene of 2 to 6 carbon atoms, an alkadienylene radical of 4 to 6 carbon atoms, a cycloalkylene radical of 3 to 4 carbon atoms, a cycloalkenylene radical of 4 carbon atoms, or one of said divalent radicals or methylene respectively having, as substituents, alkyl of 1–3 carbon atoms, alkoxy of 1–3 carbon atoms, chlorine, or nitro, and R^3 may also be unsubstituted methylene if at least one radical R^1 is alkyl.

3,992,417
PROCESS FOR MANUFACTURE OF GAMMA BUTYROLACTONES

Ralph Dessau, Edison Township, Middlesex County, and El-Ahmadi Heiba, Princeton Township, Mercer County, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 772,994, Nov. 4, 1968, abandoned, which is a continuation-in-part of Ser. No. 714,447, March 30, 1968, abandoned, which is a continuation-in-part of Ser. No. 30,582, April 21, 1970, abandoned, which is a continuation-in-part of Ser. No. 336,857, Feb. 28, 1973. This application Aug. 15, 1974, Ser. No. 497,593

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 **11 Claims**

1. In a method of preparing a gamma-butyrolactone by reacting, in liquid acetic acid contained in a reaction zone, a minor fraction of said acetic acid with an aliphatic olefin that has an empirical formula C_nH_{2n} in which n is from 3 to 92 and a stoichiometric amount of an ion of manganese in higher-valent form, to form in said reaction zone a mixture comprising said gamma-butyrolactone, an ion of manganese in lower-valent form and a major fraction of said acetic acid, the improvement in the recovery of said gamma-butyrolactone comprising the steps of:

passing to a recovery zone said mixture comprising said gamma-butyrolactone, an ion of manganese in lower-valent form and a major fraction of said acetic acid;

treating said mixture with sufficient lactone solvent to effect separation into two streams, the first stream comprising said gamma-butyrolactone substantially free of said ion of manganese in lower-valent form, the second stream comprising said ion of manganese in lower-valent form and said major fraction of acetic acid substantially free of said gamma-butyrolactone;

recovering said gamma-butrolactone from said first stream;

converting, in said second stream, said ion of manganese in lower-valent form to higher-valent form;

and recovering from said second stream a mixture, reusable in said reaction zone, consisting essentially of said major fraction of acetic acid and said ion of manganese in higher-valent form.

3,992,418
PRODUCTION OF PYROMELLITIC DIANHYDRIDE

Stephen N. Massie, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed July 1, 1974, Ser. No. 485,051

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.4 **10 Claims**

1. A process for the preparation of pyromellitic dianhydride which comprises

a. treating pseudocumene with propylene, said propylene being present in a stoichiometric excess, at a temperature of from about 0° to about 150°C and a pressure of from about 1 atmosphere to about 100 atmospheres in the presence of a catalyst comprising a Lewis acid, a mineral acid or a zero-valent molybdenum-carbon monoxide complex to product 2,4,5-trimethylcumene and diisopropyl-substituted pseudocumenes;

b. treating the resultant 2,4,5-trimethylcumene and diisopropyl-substituted pseudocumenes with an oxygen-containing gas in the presence of a catalyst comprising a vanadium-containing compound dispersed on an inorganic oxide support at a temperature of from about 100° to about 500°C and a pressure of from about 1 atmosphere to about 100 atmospheres;

c. decarboxylating the polycarboxylated treatment product at a temperature of from about 450° to about 600°C at atmospheric pressure or a temperature of from about 270°C to about 400°C at subambient pressures to produce pyromellitic dianhydride; and

d. recovering the resultant pyromellitic dianhydride.

3,992,419
METHOD OF PREPARING MALEIC ANHYDRIDE AND CATALYSTS UTILIZED THEREFOR

Tadaaki Otaki, Komae; Naoto Wada, Yokohama, and Masakatu Hatano, Machida, all of Japan, assignors to Mitsubishi Kasei Kogyo Kabushiki Kaisha, Japan

Filed Apr. 21, 1975, Ser. No. 569,669

Claims priority, application Japan, Apr. 19, 1974, 49-44274; Dec. 27, 1974, 49-597

Int. Cl.² C07D *307/60;* **B01J** *27/14*

U.S. Cl. 260—346.8 A **22 Claims**

1. A method of preparing maleic anhydride which comprises the vapor phase oxidation of an unsaturated hydrocarbon containing at least carbon atoms in each molecule, at a reaction temperature of from 250° to 550° C in the presence of a catalyst comprising a mixed or complex oxide expressed by the general formula:

$$P_aMo_bBi_cCu_dX_eO_f$$

where P, Mo, Bi, Cu and O represent phosphorus, molybdenum, bismuth, copper and oxygen, respectively; X represents at least one member selected from the group consisting of iron, cobalt, nickel and potassium; a, b, c, d and f represent the number of atoms of said phosphorus, molybdenum, bismuth, copper and oxygen, respectively; wherein $a = 0.05–10$, $b = 12$, $C = 0.05–5$, $d = 0.01 - 5$, $e = 0.01 - 5$ and the value of f is determined by the values of said a, b, c, d and e and the valencies of each element contained in said oxide.

3,992,420
3,5-DIALKYL-4-HYDROXYBENZYL-OXIRANES

Hanns Lind, Liestal; Rolf Hugi, Basel, and Heimo Brunetti, Reinach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

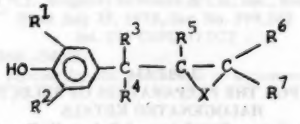
Continuation of Ser. No. 368,401, June 8, 1973, abandoned. This application May 7, 1975, Ser. No. 575,314

Claims priority, application Switzerland, June 12, 1972, 8700/72

Int. Cl.² C07D *303/14*

U.S. Cl. 260—348 R **7 Claims**

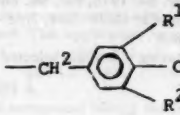
1. Compounds of the formula I



(I)

in which R^1 is alkyl with 1 to 8 carbon atoms, R^2 is alkyl with 1 to 8 carbon atoms, R^3, R^4, and R^6 independently of one

another are hydrogen, R^5 is hydrogen or methyl, R^7 is hydrogen, alkyl with 1 to 17 carbon atoms, halogenomethyl, phenyl or a



radical and X is O or S.

3,992,421

6-ANILINO-1,4,5-TRIHYDROXYANTHRAQUINONES

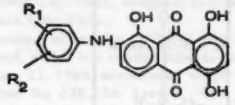
Raouf Botros, Beech Creek, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Division of Ser. No. 374,772, June 28, 1973, Pat. No. 3,927,964. This application Apr. 30, 1975, Ser. No. 573,142

Int. Cl.² C07C *103/75, 97/26*

U.S. Cl. 260—377 **1 Claim**

1. A compound of the formula



each of R_1 and R_2 is independently hydrogen, chlorine, bromine, alkyl having from 1–8 carbon atoms, alkoxy having from 1–8 carbom atoms, hydroxy(lower alkyl), N-lower alkylamino, N,N-di-lower alkylamino, lower alkoxy lower alkyl, lower alkoxy lower alkoxy and acylamido having up to 7 carbon atoms.

3,992,422

PROCESS FOR THE PREPARATION OF 21-HALOGENO-21-DESOXY-17α-ACYLOXY-20-KETO-PREGNENES

Michael J. Green, Kendall Park, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Aug. 14, 1975, Ser. No. 604,672

Int. Cl.² C07J *5/00*

U.S. Cl. 260—397.45 **7 Claims**

1. The process for the preparation of a 21-halogeno-17α-acyloxy-20-ketopregnene, said halogeno being chloro or bromo, which comprises the reaction of a 17,21-dihydroxy-20-ketopregnene 17,21-orthoester with a halide reagent selected from the group consisting of triphenylsilyl halide, tri-(alkyl substituted phenyl)-silyl halide, and tri-lower alkylsilyl halide, said halide being chloride or bromide, in an organic solvent.

3,992,423

PRODUCTION OF CARBOXYLIC ACIDS FROM OLEFINS WITH A ZEOLITE IN ALUMINUM HYDROSOL CATALYSTS

Stephen N. Massie, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 26, 1974, Ser. No. 536,537

Int. Cl.² C07C *67/38, 51/14, 69/24, 69/74*

U.S. Cl. 260—410.6 **15 Claims**

1. A process for the preparation of carboxylic acids and esters thereof which comprises: reacting an unsaturated hydrocarbon from the group consisting of aliphatic olefins and cycloaliphatic olefins with carbon monoxide and a stochiometric excess relative to said unsaturated compound of a compound selected from the group consisting of water, an alkanol possessing from 1 to 10 carbon atoms and an alkandiol possessing from 2 to 10 carbon atoms at a temperature in the range of from about 25° to about 300° C and a pressure of from about atmospheric to about 500 atmospheres in the presence of a catalyst consisting essentially of a crystalline aluminosilicate zeolite which has been treated by dispersing said zeolite in an aluminum hydrosol prior to aging, aging at aging conditions, and drying at drying conditions.

3,992,424

TRIFLUOROMETHYL-SUBSTITUTED COMPOUNDS

Richard J. Lagow, Manchester; Lois L. Gerchman, Stoneham, both of Mass., and Robert A. Jacob, Grand Forks, N. Dak., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 444,465, Feb. 21, 1974. This application Oct. 1, 1975, Ser. No. 618,525

Int. Cl.² C07F *5/00, 5/06*

U.S. Cl. 260—429.1 **9 Claims**

1. A compound selected from the group consisting of bis(-trifluoromethyl)tellurium, tetrakis(trifluoromethyl)M, and hexakis(trifluoromethyl)M′ wherein M is tin, germanium, uranium and platinum, and M′ is tungsten, uranium and aluminium.

3,992,425

ORGANOTIN MITICIDAL AND INSECTICIAL COMPOUNDS

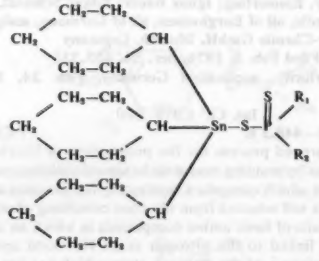
Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 293,974, Oct. 2, 1972, abandoned, which is a continuation-in-part of Ser. No. 208,046, Dec. 10, 1971, abandoned. This application June 24, 1974, Ser. No. 482,033

Int. Cl.² C07F *7/22*

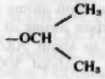
U.S. Cl. 260—429.7 **10 Claims**

1. A composition of matter consisting of the formula



wherein R_1 and R_2 are different and are selected from the group consisting of lower alkyl, lower alkoxy, cycloalkoxy, thiophenyl, haloalkyl, alkoxythioalkyl, and thiocyano.

9. A composition of claim 8 wherein R_1 and R_2 are



3,992,426
QUADRIPOLYMER SILOXANES CONTAINING SI-H BONDS

Gordon Carlton Johnson, Armonk; Richard Bruce Metzler, Ossining, both of N.Y., and Donald Leroy Bailey, Sistersville, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 22, 1973, Ser. No. 390,408

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl. C07f *7/08*

U.S. Cl. 260—448.2 H **5 Claims**

1. A quadripolymer siloxane having the average structure
$R_3SiO(R_2SiO)_a(RHSiO)_b(H_2SiO)_cSiR_3$
in which the sum of a + b + c is up to 175 and the ratio of b:a is from 0.1:1 to 0.35:1, the ratio of c:a is from 0.1:1 to 0.25:1 and the ratio of b:c is from 0.9:1 to 1.6:1 and R is alkyl of from 1 to 3 carbon atoms.

3,992,427
PREPARATION OF ORGANOSILICON COMPOUNDS

Grish Chandra, Penarth; Brian John Griffiths, Coytrahen, near Bridgend, and Stephen Westall, Barry, all of Wales, assignors to Dow Corning Limited, Barry, Wales

Filed Feb. 20, 1976, Ser. No. 659,806

Claims priority, application United Kingdom, Feb. 25, 1975, 7729/75

Int. Cl.² C07F *7/08*, *7/18*

U.S. Cl. 260—448.2 E **3 Claims**

1. A process for the preparation of an organosilicon product which comprises reacting (A) a silicon compound having in the molecule at least one silicon-bonded hydrogen atom and (B) an organic or organosilicon compound having in the molecule aliphatic carbon atoms linked by multiple bonds, in the presence of (C) a compound or complex of platinum or rhodium and (D) a cobalt salt of a monocarboxylic acid, (A) and (B) being free of silicon-bonded halogen atoms.

3,992,428
PROCESS FOR PREPARING BIS-(TRIMETHYLSILYL-)UREA

Horst Muller, Emmerting; Ignaz Bauer; Edgar Schmidt, and Rudolf Riedle, all of Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Feb. 5, 1976, Ser. No. 655,333

Claims priority, application Germany, Feb. 24, 1975, 2507882

Int. Cl.² C07F *7/10*

U.S. Cl. 260—448.2 E **7 Claims**

1. An improved process for the preparation of bis-(trimethylsilyl-)urea by reacting urea with hexamethyldisilazane, the improvement which comprises conducting the reaction in the presence of a salt selected from the class consisting of ammonium salts, salts of basic amine compounds in which an active hydrogen is linked to the nitrogen as an HN-bond and the remaining valences of the nitrogen atom which are not saturated with hydrogen are saturated with carbon atoms, and acid salts of quaternary ammonium hydroxides which in a dilute aqueous solution have an acid dissociation constant of at least 10^{-4} at 25° C.

3,992,429
ALKOXYSILANE MULTIPLE CLUSTER COMPOUNDS AND THEIR PREPARATION

Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

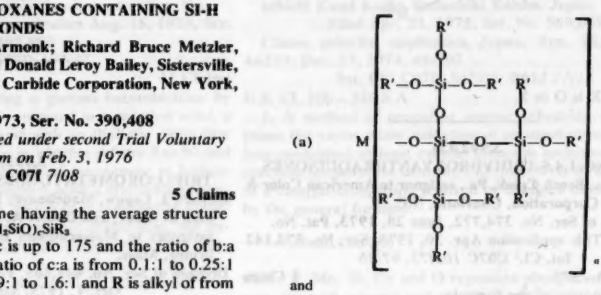
Filed Mar. 24, 1976, Ser. No. 669,714

Int. Cl.² C07F *7/04*, *7/18*

U.S. Cl. 260—448.8 A **19 Claims**

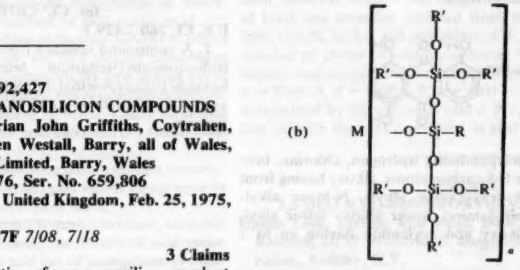
1. A compound having a formula selected from the following:

(a)



and

(b)



wherein $a = 2$, 3 or 4; M is a substituted or unsubstituted branched or straight chain hydrocarbon radical; R is hydrogen, an alkyl, alkenyl, aryl or aralkyl group and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

3,992,430
PROCESS FOR PREPARING AROMATIC ISOCYANATES

Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sept. 11, 1975, Ser. No. 612,408

Int. Cl.² C07C *118/00*

U.S. Cl. 260—453 P **4 Claims**

1. A process for preparing aromatic isocyanates, which comprises: transesterifying an N-aryl alkylcarbamate with a phenolic compound having a hydroxy group directly attached to an aromatic nucleus to prepare an N-aryl arylcarbamate; and thermally decomposing said N-aryl arylcarbamate at a temperature from about 200° to 300° C to prepare said aromatic isocyanate.

3,992,431

QUATERNARY COMPOUNDS HAVING ANTI-MICROBIAL ACTIVITY

Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 400,097, Sept. 24, 1973, Pat. No. 3,928,411, which is a continuation of Ser. No. 39,536, May 21, 1970, abandoned. This application Aug. 20, 1975, Ser. No. 606,311

Int. Cl.² C07C *155/02*

U.S. Cl. 260—455 A 4 Claims

1. A chemical compound having the formula:

$$[RNHCSO(CH_2)_nN^+(CH_3)_2R']X^-$$

wherein R is 1-adamantyl, R′ is a long chain alkyl group of 10 to 18 carbon atoms, *n* is an integer of 1 to 3 and X is an anion.

3,992,432

PHASE TRANSFER CATALYSIS OF HETEROGENEOUS REACTIONS BY QUATERNARY SALTS

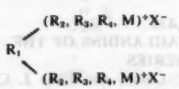
Donald R. Napier, Corpus Christi, Tex., and Charles M. Starks, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation of Ser. No. 240,283, March 31, 1972, abandoned, which is a continuation-in-part of Ser. No. 778,324, Nov. 22, 1968, abandoned, which is a continuation-in-part of Ser. No. 628,534, April 5, 1967, abandoned. This application Feb. 18, 1975, Ser. No. 550,246

Int. Cl.² C07C *120/04*

U.S. Cl. 260—465.1 24 Claims

1. A process for conducting heterogeneous ionic reactions in a two-phase reaction system containing an organic phase and an aqueous phase, said reaction being conducted in the presence of an organic quaternary salt phase transfer catalyst, said salt transferring a functional reactant ion or group from either phase to the other phase, said quaternary salt being defined by $(R_1, R_2, R_3, R_4, M)^+ X^-$ wherein M is nitrogen, arsenic, phosphorus, antimony, and bismuth; X is a halide or hydroxy ion; and R_1, R_2, R_3, and R_4 are monovalent hydrocarbon radicals having a total sum of 18 to 70 carbon atoms, one of which may be further substituted by a quaternary group so that the salt is represented by



3,992,433

NOVEL RESINS

Junji Ariyoshi, Hirakata, and Noboru Kariya, Sakai, both of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha and Nard Institute, Ltd., both of, Japan

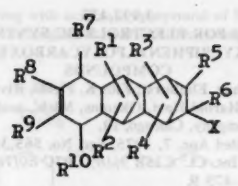
Continuation of Ser. No. 296,780, Oct. 12, 1972, abandoned. This application June 23, 1975, Ser. No. 589,025

Claims priority, application Japan, Oct. 13, 1971, 46-80794; Oct. 21, 1971, 46-83774

Int. Cl.² C07C *61/12*, *61/28*, *69/79*

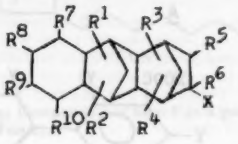
U.S. Cl. 260—468 G 6 Claims

1. A resin having a formula of



wherein each of R^1, R^2, R^3, R^4, R^5 and R^6 is hydrogen or methyl group, each of R^7, R^8, R^9 and R^{10} is hydrogen, alkyl group having 1 to 6 carbon atoms or phenyl group and X is —COOM or —$COOR^a$, M being hydrogen, $-NH_4$ or alkali metal, R^a being alkyl group having 1 to 4 carbons.

6. A resin having the formula



wherein each of R^1, R^2, R^3, R^4, R^5 and R^6, is hydrogen or methyl group, each of R^7, R^8, R^9 and R^{10} is hydrogen, alkyl group having 1 to 6 carbon atoms or phenyl group and X is —COOM or —$COOR^a$, M being hydrogen, $-NH_4$ or alkali metal, R^a being alkyl group having 1 to 4 carbons.

3,992,434

ETHANOL- AND SUBSTITUTED ETHANOLAMIDES OF HINDERED 3,5-DIALKYL-4-HYDROXYBENZOIC ACIDS

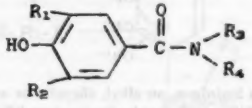
John Christian Oppelt, Somerville, and Peter Vincent Susi, Middlesex, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,155

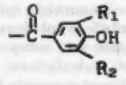
Int. Cl.² C07C *9/78*, *103/26*

U.S. Cl. 260—473 S 4 Claims

1. A compound of the formula:



wherein R_1 and R_2 are each branch-chain alkyl of 3 to 8 carbon atoms, R_3 is $—CH_2CH_2OZ$ wherein Z is hydrogen or



and R_4 is hydrogen or R_3.

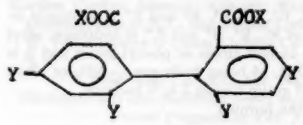
3,992,435

PROCESS FOR ELECTROLYTIC SYNTHESIS OF POLYALKYLBIPHENYLPOLYCARBOXYLIC ACID COMPOUNDS

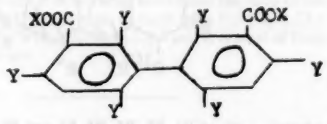
John A. Donohue, Elmhurst; Ellis K. Fields, River Forest, both of Ill., and Harold Hart, Okemos, Mich., assignors to Standard Oil Company, Chicago, Ill.

Filed Apr. 7, 1975, Ser. No. 565,356
Int. Cl.² C25B 3/10; C07C 69/76
U.S. Cl. 260—475 R 12 Claims

8. A polyalkylbiphenylpolycarboxylic acid compound of the structural formula



A



B

where X is selected from the group consisting of hydrogen and Y wherein Y is an alkyl radical of from one to four carbon atoms.

3,992,436

SYNTHESIS OF OXALATE ESTERS FROM CARBON MONOXIDE AND CARBOXYLIC ORTHO ESTERS

Lee R. Zehner, Media, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 2, 1976, Ser. No. 646,120
Int. Cl.² C07C 69/36
U.S. Cl. 260—485 R 28 Claims

1. A process for the preparation of oxalate esters which comprises reacting under substantially anhydrous conditions, a carboxylic ortho ester having the formula

wherein R is hydrogen, an alkyl, alicyclic or aryl group, and R′, R″ and R‴, which may be the same or different, are alkyl or aralkyl groups which may contain substituents which do not interfere with the reaction, with carbon monoxide and oxygen at a pressure of between about 500 psi and 300 psi and at a temperature in the range of about 50° C. to 200° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium, platinum, rhodium, cadmium, cobalt, zinc and copper salt compounds and a catalytic amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine or ammonia and a monohydric aliphatic, alicyclic or aromatic alcohol and recovering the desired oxalate ester.

3,992,437

POLYHYDROPHENANTHRENE DERIVATIVES

Philip E. Shaw, Winter Haven, Fla.; Sol J. Daum, Albany, and Robert L. Clarke, Bethlehem, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 393,623, Aug. 31, 1973, Pat. No. 3,922,312, which is a division of Ser. No. 269,402, July 6, 1972, Pat. No. 3,830,843, which is a division of Ser. No. 879,920, Nov. 25, 1969, Pat. No. 3,755,361, which is a continuation-in-part of Ser. No. 585,762, Oct. 11, 1966, Pat. No. 3,592,838. This application Apr. 7, 1975, Ser. No. 565,957
Int. Cl.² C07C 69/12, 49/54
U.S. Cl. 260—488 B 5 Claims

1. 1,2,3,4,4a,4b,5,6,7,8,10,10a-dodecahydro-7-oxophenanthrene bearing two lower-alkyl groups in the 8-position, a hydroxy or oxo group in the 2-position, and wherein the 10-position is unsubstituted or bears a hydroxy or acyloxy group wherein the acyl group is a carboxylic acyl group having from one to twelve carbon atoms and a molecular weight less than about 250.

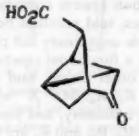
3,992,438

NOVEL PROSTAGLANDIN INTERMEDIATES

Elias J. Corey, Cambridge, Mass.; Jasjit S. Bindra, Groton, and Thomas K. Schaaf, Old Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 409,068, Oct. 24, 1973, Pat. No. 3,943,151. This application Nov. 19, 1975, Ser. No. 633,222
Int. Cl.² C07C 61/36
U.S. Cl. 260—514 G 1 Claim

1. A compound of the structure:



3,992,439

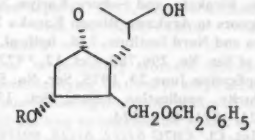
SYNTHESIS OF PROSTAGLANDINS OF THE "ONE"-SERIES

Thomas K. Schaaf, Old Lyme, Conn., and Elias J. Corey, Cambridge, Mass., assignors to Pfizer Inc., New York, N.Y.

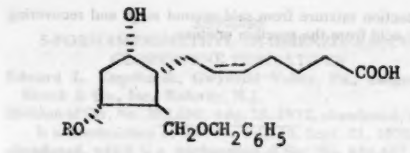
Division of Ser. No. 244,882, April 17, 1972, Pat. No. 3,887,587. This application Feb. 14, 1975, Ser. No. 549,875
Int. Cl.² C07C 177/00
U.S. Cl. 260—514 D 2 Claims

1. A process for the preparation of prostaglandins of the "one"-series comprising the steps of:

A. contacting the ylide of (4-carboxy-n-butyl)triphenylphosphonium bromide with a compound of the formula

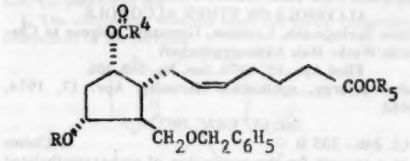


to produce a hydroxycarboxylic acid of the formula:

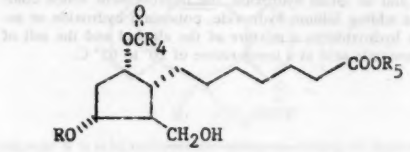


and esterifying the carboxy and acylating the hydroxy group of said hydroxycarboxylic acid;

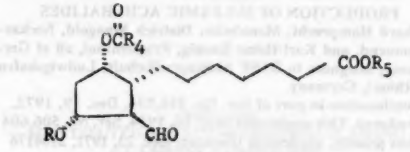
B. catalytically hydrogenating the resulting compound of the formula:



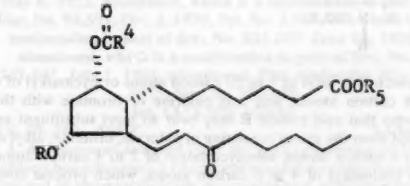
to form a saturated compound of the formula:



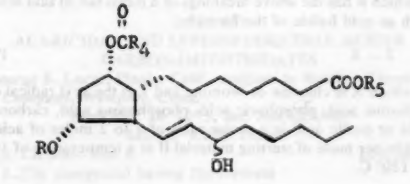
C. oxidizing said saturated compound to form an aldehyde of the formula:



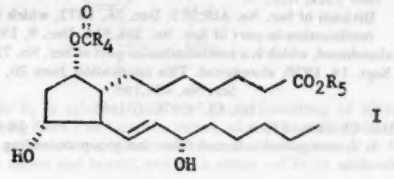
D. contacting said aldehyde with the ylide of dimethyl-2-oxoheptylphosphonate to form a compound of the formula:



E. reducing said compound of Step D to form a compound of the formula:

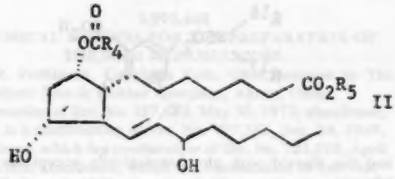


F. hydrolyzing with acid said compound of Step E to form, after chromatographic purification, compounds of the formula:



I

and



II

and

G. converting Compound I of Step F to a prostaglandin of the "one"-series.

3,992,440

4-ETHERS OF 3-AMINO-5-SULFAMOYLBENZOIC ACIDS

Lincoln Harvey Werner, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

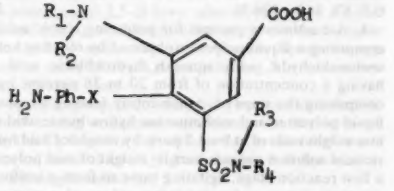
Continuation-in-part of Ser. No. 297,530, Oct. 13, 1972. This application Aug. 8, 1973, Ser. No. 386,828

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C07C *143/80*

U.S. Cl. 260—516 **7 Claims**

1. A 4-phenylether of the 3-amino-5-sulfamoylbenzoic acid corresponding to the formula



in which R_1 is lower alkyl, lower alkenyl, cycloalkyl or cycloalkyl-lower alkyl each of which with 3 to 7 ringcarbon atoms, R_2 is hydrogen, lower alkyl or lower alkenyl R_3 is hydrogen or lower alkyl, X is oxygen or sulfur, Ph is unsubstituted phenylene or phenylene substituted by one member of lower alkyl, and R_4 is hydrogen or lower alkyl, or the lower alkyl esters or therapeutically useful ammonium, alkali or alkaline earth metal or acid addition salts thereof.

3,992,441

SULFAMYLBENZOIC ACIDS

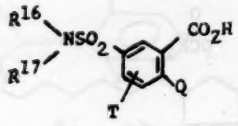
Gerald F. Helland, Old Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 318,213, Dec. 26, 1972, which is a continuation-in-part of Ser. No. 206,514, Dec. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 72,156, Sept. 14, 1970, abandoned. This application June 20, 1974, Ser. No. 481,195

Int. Cl.[2] C07C *101/42*

U.S. Cl. 260—518 A 16 Claims

1. A compound selected from the group consisting of the formula



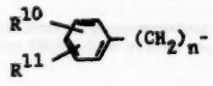
and the thereof with pharmacologically acceptable bases, wherein

Q is selected from the group consisting of hydrogen, chloro, fluoro and bromo;

T is selected from the group consisting of chloro, fluoro and bromo;

R^{16} is selected from the group consisting of hydrogen and lower alkyl

R^{17} is phenylalkylene of the formula



wherein *n* has a value of 0 to 3 and R^{10} and R^{11} are each selected from the group consisting of hydrogen, methyl, chloro, bromo and phenyl.

3,992,442

PROCESS FOR THE CONTINUOUS PRODUCTION OF SORBIC ACID

Osamu Kageyama, Ohmiya; Manabu Kai; Tadayuki Mitani, both of Ohimachi; Akira Asahi, and Sadao Sasaki, both of Arai, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Dec. 13, 1974, Ser. No. 532,578

Claims priority, application Japan, Dec. 14, 1973, 48-140583

Int. Cl.[2] C07C *51/00*

U.S. Cl. 260—526 N 3 Claims

1. A continuous process for preparing sorbic acid, by decomposing a liquid polyester obtained by reacting ketene and crotonaldehyde, with aqueous hydrochloric acid solution having a concentration of from 20 to 36 percent by weight, comprising the steps of: continuously feeding streams of said liquid polyester and said aqueous hydrochloric acid solution, in a weight ratio of at least 2 parts by weight of said hydrochloric acid solution per one part by weight of said polyester, into a first reaction stage, agitating same to form a uniform liquid reaction mixture and maintaining said reaction mixture in said first stage for a period of time effective to decompose therein not more than 45 weight percent of said polyester, continuously feeding a stream of said reaction mixture leaving the first reaction stage into a second reaction stage, agitating the reaction mixture in the second stage and maintaining said reaction mixture in said second stage for a period of time effective to decompose therein not less than 90 percent by weight of said polyester, the reaction temperature of both the first and second stages being in the range of from 60° to 95° C, discharging the reaction mixture from said second stage and recovering sorbic acid from the reaction mixture.

3,992,443

PROCESS FOR THE CARBOXYMETHYLATION OF ALCOHOLS OR ETHER ALCOHOLS

Hermann Springmann, Lavesum, Germany, assignor to Chemische Werke Huls Aktiengesellschaft

Filed Apr. 15, 1975, Ser. No. 568,206

Claims priority, application Germany, Apr. 17, 1974, 2418444

Int. Cl.[2] C07C *59/22*

U.S. Cl. 260—535 R 13 Claims

1. In a process for the production of carboxymethylated alcohols by the reaction of an alcohol, a salt of chloroacetic acid and an alkali hydroxide, the improvement which comprises adding lithium hydroxide, potassium hydroxide or sodium hydroxide to a mixture of the alcohol and the salt of chloroacetic acid at a temperature of 20° to 65° C.

3,992,444

PRODUCTION OF SULFAMIC ACID HALIDES

Gerhard Hamprecht, Mannheim; Dietrich Mangold, Neckargemuend, and Karl-Heinz Koenig, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

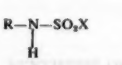
Continuation-in-part of Ser. No. 316,534, Dec. 19, 1972, abandoned. This application Sept. 16, 1974, Ser. No. 506,604

Claims priority, application Germany, Dec. 23, 1971, 2164176

Int. Cl.[2] C07C *143/72*

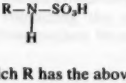
U.S. Cl. 260—543 R 10 Claims

1. A process for the production of a sulfamic acid amide of the formula



I,

in which R is alkyl of 1 to 20 carbon atoms or cycloalkyl of 4 to 8 carbon atoms, and x is chlorine or bromine with the proviso that said radical R may bear an inert substituent selected from the group consisting of chlorine, bromine, alkyl of 1 to 4 carbon atoms, alkoxycarbonyl of 2 to 4 carbon atoms and cycloalkyl of 4 to 6 carbon atoms, which process comprises: reacting a sulfamic acid of the formula



II,

in which R has the above meanings or a metal salt of said acid, with an acid halide of the formula

IV,

in which X is chlorine or bromine and Z is the acyl radical of sulfurous acid, phosphoric acid, phosphorous acid, carbonic acid or oxalic acid in a molar ratio of 1 to 2 moles of acide halide per mole of starting material II at a temperature of 10° to 120° C.

3,992,445

5-FORMAMIDOMETHYL-5H-DIBENZO[A,D]CYCLOHEPTENE DERIVATIVES

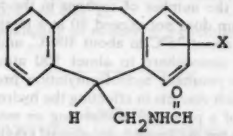
Edward L. Engelhardt, Gwynedd Valley, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 283,680, Aug. 25, 1972, abandoned, which is a continuation of Ser. No. 74,140, Sept. 21, 1970, abandoned, which is a continuation of Ser. No. 656,657, July 28, 1967, abandoned, which is a continuation of Ser. No. 422,488, Dec. 31, 1964, abandoned. This application Aug. 21, 1973, Ser. No. 390,277

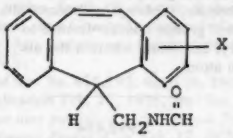
Int. Cl.² C07C *103/127*

U.S. Cl. 260—556 AR 5 Claims

1. The compound selected from the group consisting of a compound of the formula



or



wherein X is selected from the group consisting of hydrogen, halogen, lower alkyl, trifluoromethyl, lower alkoxy, lower alkylsulfonyl, lower alkylmercapto and dilower alkylsulfamoyl.

3,992,446

SUBSTITUTED AMINOCHLOROBENZYLAMINO GUANIDINE COMPOUNDS

Andrew Stephen Tomcufcik, Old Tappan, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 383,419, July 27, 1973, Pat. No. 3,901,944, which is a continuation-in-part of Ser. No. 251,096, May 8, 1972, abandoned, which is a continuation-in-part of Ser. No. 94,591, Dec. 2, 1970, Pat. No. 3,769,432, which is a continuation-in-part of Ser. No. 833,167, June 13, 1969, abandoned, which is a continuation-in-part of Ser. No. 741,247, July 1, 1968, abandoned. This application May 1, 1975, Ser. No. 573,688

Int. Cl.² C07C *133/10*

U.S. Cl. 260—564 F 2 Claims

1. A compound selected from the group consisting of 1-(4-chloro-benzylamino)-3-(4-chlorobenzylideneamino)guanidine and its pharmaceutically acceptable acid additional salts.

3,992,447

ACARICIDAL AND LEPIDOPTERICIDAL ACTIVE CARBON-IMIDOTHIOATES

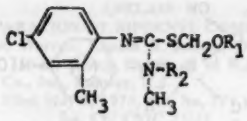
George B. Large, Pinole, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 20, 1975, Ser. No. 623,844

Int. Cl.² C07C *123/00*

U.S. Cl. 260—564 E 12 Claims

1. The compound having the formula



wherein R_1 is selected from the group consisting of alkyl containing from 1 to 4 carbon atoms, alkynyl containing from 1 to 4 carbon atoms, alkoxy alkylene containing from 2 to 4 carbon atoms and benzyl, and R_2 is either $-CH_3$ or $-H$.

3,992,448

CHEMICAL PROCESS FOR THE PREPARATION OF THIURAM MONOSULFIDES

Alan R. Parkinson, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 257,648, May 30, 1972, abandoned, which is a continuation of Ser. No. 797,353, Jan. 24, 1969, abandoned, which is a continuation of Ser. No. 721,518, April 15, 1968, abandoned, which is a continuation of Ser. No. 461,551, June 4, 1965, abandoned. This application Jan. 10, 1975, Ser. No. 540,190

Int. Cl.² C07C *155/10*

U.S. Cl. 260—567 1 Claim

1. In a method of preparing thiuram monosulfide by reacting a water slurry of tetramethyl thiuram disulphide with sodium cyanide, the improvement for providing (1) a product yield of a range of about 95.5 to about 98.7 weight percent and (2) an improved product purity in the range of about 96.4 to about 98.2 weight percent both of said thiuram monosulphide which comprises the sequential steps of first preparing a substantially neutral water slurry of said tetramethyl thiuram disulphide and about 5 to about 20 mole percent, based on said thiuram disulphide, of sodium dimethyl dithiocarbamate, then subsequently slowly mixing with said slurry about 105 to about 120 mole percent, based on said thiuram disulphide, of sodium cyanide and reacting said mixture at a temperature in the range of about 40° C. to about 70° C.

3,992,449

2-(γ-AMINOPROPYL)HYDROQUINONES AND PROCESS FOR PRODUCING THE SAME

Shinichi Imai, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 18, 1974, Ser. No. 524,836

Claims priority, application Japan, Nov. 16, 1973, 48-128987

Int. Cl.² C07C *91/34*, *93/14*, *121/75*

U.S. Cl. 260—570.8 R 18 Claims

1. A γ-aminopropyl-2,5-di-lower alkoxybenzene or a derivative thereof having additional substituents on the benzene nucleus in the 3-, 4- and/or 6-position wherein the substituents can be one or more of an alkyl group having 5 or less carbon atoms or a halogen atom.

3. A 1-(γ-aminopropyl)-2,5-dihydroxybenzene or a derivative thereof having additional substituents on the benzene nucleus in the 3-, 4- and/or 6-position wherein the substituents can be one or more of an alkyl group having 5 or less carbon atoms or a halogen atom.

3,992,450

2,3-DISUBSTITUTED-1-INDANONES

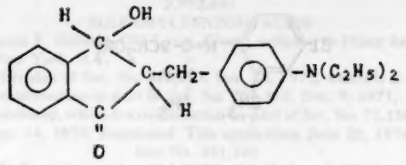
John Fred Neumer, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 30, 1971, Ser. No. 139,281

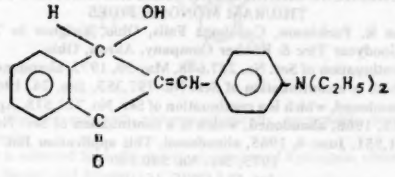
Int. Cl.² C07C *97/10*; C09B *11/02*

U.S. Cl. 260—570 R 4 Claims

1. A compound having the formula



2. A compound having the formula



3,992,451

PREPARATION OF KETONES

Louis Schmerling, Riverside, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 212,753, Dec. 27, 1971, abandoned. This application Jan. 31, 1974, Ser. No. 438,484

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07C *45/02*

U.S. Cl. 260—586 C 10 Claims

1. A process for the preparation of a ketone which comprises reacting a hydrocarbon selected from the group consisting of saturated and alkylaromatic hydrocarbons with an olefinic hydrocarbon in the presence of carbon monoxide, anhydrous or aqueous hydrogen chloride and an organic peroxy free radical catalyst at a temperature at least as high as that necessary to generate free radicals, and recovering the resultant ketone.

3,992,452

METHOD FOR THE PRODUCTION OF ALKOXYCYCLOHEXANONES

Allan B. McKague, Vancouver; William deWaal, Richmond, and Carl E. Van Winckel, West Vancouver, all of Canada, assignors to CPC International Inc., Englewood Cliffs, N.J.

Division of Ser. No. 251,132, May 8, 1972, Pat. No. 3,819,719, which is a continuation-in-part of Ser. No. 233,795, March 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 124,449, March 15, 1971, abandoned. This application Apr. 26, 1974, Ser. No. 464,554

Int. Cl.² C07C *45/00*, *41/10*

U.S. Cl. 260—586 R 6 Claims

1. A process for the preparation of an alkoxycyclohexanone selected from the group consisting of 2-methoxy and 2-ethoxycyclohexanone in high yield, comprising:

heating a reaction mass consisting essentially of 2-chlorocyclohexanone dissolved in an excess of a monohydric alkyl alcohol having 1 or 2 carbon atoms in a closed vessel to a temperature of from 110° to 200° C. to yield the corresponding alkoxycyclohexanone and hydrogen chloride,

removing excess alcohol from the reaction mass, and

recovering the alkoxycyclohexanone from the reaction mass.

3,992,453

HYDROFORMYLATION PROCESS

Stephen N. Massie, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 22, 1974, Ser. No. 472,241

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07C *45/08*, *29/02*

U.S. Cl. 260—604 HF 13 Claims

1. In a method for the hydroformylation of an unsaturated compound which comprises reacting a C_3 to C_{18} alkene with carbon monoxide and hydrogen in the presence of a catalyst comprising cobalt hydrocarbonyl wherein the hydrocarbonyl contains from about 1 to about 20 carbon atoms or a complex between cobalt, carbon monoxide and a tertiary organo phosphine wherein the number of carbons in the tertiary organo phosphine group does not exceed 30 at a temperature in the range of from about 75°C to about 300°C, and a pressure of from about 1 atmosphere to about 500 atmospheres, and recovering the resultant hydroformylation product, the improvement which consists in effecting the hydroformylation in the presence of a promoter comprising an ester of carbonic acid selected from the group consisting of ethylene carbonate, propylene carbonate, diphenyl carbonate, dialkyl carbonate wherein the alkyl groups contain from 2 to 10 carbon atoms and phenyl alkyl carbonate wherein the alkyl group contains 2 to 10 carbon atoms.

3,992,454

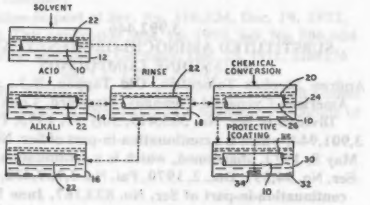
PROTECTIVE COATING FOR ARTICLES

Saul Kessler, Canoga Park, Calif., assignor to Joseph W. Aidlin, Los Angeles, Calif.

Continuation-in-part of Ser. No. 137,429, April 26, 1971, abandoned. This application Jan. 2, 1974, Ser. No. 429,911

Int. Cl.² C07F *5/02*

U.S. Cl. 260—590 R 9 Claims

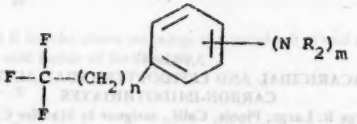


1. A composition comprising the wax-like reaction product having a decomposition temperature of at least 575° F of:

a polychloro-substituted aliphatic compound containing 1–8 carbon atoms;

a metal halide selected from a fluoride, chloride, bromide or iodide of aluminum, titanium or boron; and

a fluoroalkyl aryl compound of the formula:



where *n* is an integer from 1 to 4, *m* is an integer from 0 to 2, and R is selected from hydrogen, lower alkyl, lower alkanol, aryl or aralkyl.

3,992,455

PREPARATION OF 5-SEC-ALKYL-M-CRESOL

Gerd Leston, Scott Township, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1973, Ser. No. 402,160
Int. Cl.² C07C *37/14, 39/06*
U.S. Cl. 260—619 R 31 Claims

1. A method for preparing 5 sec-alkyl-m-eresols in high concentrations comprising:

a. alkylating m-cresol with an alkene at a temperature of at least about 100° C. over a catalyst selected from silica-alumina clays and molecular sieves to form a mixture of alklated m-cresol products; and

b. isomerizing the alkylated mixture over the same catalyst for at least about two hours at a temperature of from about 250° C. to 400° C.

30. The composition of matter of 5-cyclohexyl-m-cresol.

3,992,456

SYNTHESIS OF ALKADIENOLS

Kenneth Earl Atkins, South Charleston; Robert Michael Manyik, St. Albans, and George Lawrence O'Connor, Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 816,792, April 16, 1969, abandoned. This application Feb. 27, 1975, Ser. No. 553,584
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C07C *33/02*
U.S. Cl. 260—632 R 29 Claims

1. Process for forming octadienols which comprises forming a reaction mixture containing butadiene, water, a solvent which is at least partially miscible with water and butadiene and carbon dioxide and a catalyst which is a palladium compound complexed with a phosphine ligand, causing the butadiene and water to react at a reaction temperature of from 20°C. to 180°C; to form an octadienol and recovering the octadienol from the reaction mixture; said butadiene, carbon dioxide and water being present in amounts sufficient to produce said octadienol.

3,992,457

FLAVORING AND PERFUMING INGREDIENTS

Edouard P. Demole, Coppet, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 451,423, March 15, 1974, Pat. No. 3,927,030. This application Apr. 2, 1975, Ser. No. 564,452
Claims priority, application Switzerland, Apr. 10, 1973, 5122/73; Apr. 12, 1973, 5274/73
Int. Cl.² C07C *31/02*
U.S. Cl. 260—632 R 2 Claims

1. 6-Methyl-3-isopropyl-hepta-4,6-dien-1-ol having a purity of about 95%.

3,992,458

FLAVORING AND PERFUMING INGREDIENTS

Edouard P. Demole, Coppet, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 451,423, March 15, 1974, Pat. No. 3,927,030. This application Apr. 2, 1975, Ser. No. 564,450
Claims priority, application Switzerland, Apr. 10, 1973, 5122/73; Apr. 12, 1973, 5274/73
Int. Cl.² C07C *31/20*
U.S. Cl. 260—635 R 2 Claims

1. A pure compound selected from the following group:

a. 5-isopropyl-non-3-ene-2,8-diol, and

b. 5-isopropyl-nonane-2,8-diol.

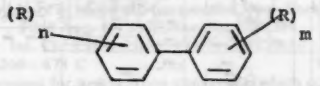
3,992,459

PREPARATION OF BIPHENYL COMPOUNDS

Torleif Utne, Warren; Ronald B. Jobson, Old Bridge, and Alfred V. Lovell, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 1, 1975, Ser. No. 571,165
Int. Cl.² C07C *25/18*
U.S. Cl. 260—649 F 5 Claims

2. A process for the preparation of a compound of formula:



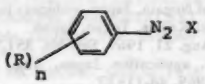
wherein the R groups can be the same or different and each is:

1. chloro or fluoro,
2. hydroxy,
3. C_{1-5} alkoxy,
4. C_{1-5} alkoxycarbonyl;

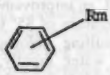
n is 0–2; and

m is 0–2;

which comprises reacting a compound of formula:



wherein X^- is the anion of fluoboric acid or trichloroacetic acid, with a compound of formula:



in the presence of a finely divided inert solid and copper powder or a copper salt and optionally a strong organic acid for 1–20 hours at +5° C. to reflux temperature.

3,992,460

PURGING OF TARS AND CARBON FROM CHLORINATED HYDROCARBON EFFLUENT

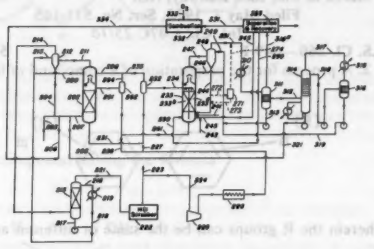
Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Continuation-in-part of Ser. No. 238,196, March 27, 1972, Pat. No. 3,968,200. This application July 15, 1974, Ser. No. 488,459
Int. Cl.² C07C *21/00*
U.S. Cl. 260—654 R 6 Claims

1. In a process for producing a C_1 to C_4 chlorinated aliphatic hydrocarbon by contacting in a first reaction zone maintained at a temperature of from 700° F to 1200° F a C_1 to C_4 aliphatic hydrocarbon with a member selected from the group consisting of hydrogen chloride, chlorine and mixtures thereof and a molten mixture containing cuprous chloride, cupric chloride and copper oxychloride, the improvement comprising:

withdrawing from the first reaction zone a chlorinated hydrocarbon effluent, containing carbon and tars; thereafter separating carbon and tars by direct contact quenching of the chlorinated hydrocarbon effluent, said quenching effecting cooling to a temperature of from 100° F to 300° F at a pressure of from 0 to 100 psig and condensing of a portion of the chlorinated hydrocarbon, said condensed chlorinated hydrocarbon containing carbon and tars present in the effluent; and introducing at least a

portion of the condensed chlorinated hydrocarbon, containing the tars and carbon into the first reaction zone to



contact said molten mixture to oxidize the tars and carbon.

3,992,461

METHOD OF PRODUCING CHLOROPRENE

Takashi Kadowaki; Takao Iwasaki; Hideki Matsumura, and Koichi Abe, all of Niigata, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1969, Ser. No. 851,915

Claims priority, application Japan, Aug. 22, 1968, 43-59555; Feb. 18, 1969, 44-11533

Int. Cl.² C07C *21/20*

U.S. Cl. 260—655 9 Claims

1. In a method of producing chloroprene by dehydrochlorinating 3,4-dichlorobutene-1 in the presence of an aqueous solution of an alkali, an improvement comprises effecting the reaction at a temperature of 85° to 100° C. to evaporate a mixture of the resulting chloroprene, unreacted 3,4-dichlorobutene-1 and water rapidly; taking out the said evaoporated reaction mixture from the reaction system without reflux to the reaction system and condensing the evaporated mixture totally; separating the condensed reaction mixture into an organic phase and an aqueous phase; and then subjecting the organic phase to a fractional distillation to separate chloroprene from 3,4-dichlorobutene-1.

3,992,462

1,1,2,2-TETRACHLOROETHANE PREPARED BY OXYCHLORINATION OF DICHLOROETHYLENES

Albert Antonini, Paris; Claude Kaziz, La Courneuve, and Georges Wetroff, Le Thillay, all of France, assignors to Produits Chimiques Pechiney-Saint Gobain, Paris, France

Filed May 20, 1968, Ser. No. 730,651

Int. Cl.² C07C *17/04*

U.S. Cl. 260—658 R 19 Claims

1. A process for preparation of 1,1,2,2-tetrachloroethane containing less than 1 molar % chlorinated ethylenic compounds formed by oxychlorination of dichloroethylene selected from the group consisting of cis-dichloroethylene and trans-dichloroethylene and mixtures thereof, comprising the steps of passing a gaseous mixture of 1,2-dichloroethylene, hydrochloric acid and a molecular oxygen-containing gas wherein the ratio of HCl to dichloroethylene is within the range of 0.8 to 2.0 and the ratio of O_2 to dichloroethylene is within the range of 0.2 to 0.6 at a temperature within the range of 200° to 360° C through a catalytic reaction zone containing an oxychlorination catalyst deposited on a carrier having a specific surface area within the range of 10–200 m^2/g in a fluidized state at a feed flow rate of the dichloroethylene of 0.5 to 20 moles per hour per liter of catalyst to effect less than 70% conversion of the dichloroethylenes fed to the reactor during passage through the catalytic reaction zone.

3,992,463

OXYCHLORINATION OF ETHYLENE WITH A FIXED BED CATALYST

Gerard Benaroya, Bois-Colombes; Maxime Graulier, Paris; Jacques Long, Saint-Auban, and Francois Laine, Martigues, all of France, assignors to Produits Chimiques Pechiney-Saint Gobain, Paris, France

Continuation of Ser. No. 730,606, May 20, 1968, abandoned. This application Mar. 27, 1972, Ser. No. 238,692

Claims priority, application France, May 19, 1967, 67.106970

Int. Cl.² C07C *17/00*

U.S. Cl. 260—659 A 9 Claims

1. The process for the oxychlorination of ethylene to produce a product stream of 1,2-dichloroethane, 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane in which at least 8 mole percent of the ethylene is converted to 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane, comprising passing a mixture of an oxygen containing gas, HCl and ethylene in which the mole ratio of HCl/C_2H_4 is within the range of 1.8 to 3.0 and the mole ratio of O_2/C_2H_4 is within the range of 0.5 and 1.5 through a first reaction zone formed of one or more tubular zones containing a fixed bed oxychlorination catalyst on a carrier at a temperature of 250° to 400° C and passing the effluent from the first reaction zone to a second reaction zone formed of one or more tubular zones containing a fixed bed oxychlorination catalyst on a carrier at a temperature within the range of 255° to 410° C, with the ratio of the diameters of each of the tubular zones of the second reaction zone to the diameters of each of the tubular zones of the first reaction zone being greater than 1 and up to 3, and the temperatuare in the second reaction zone being 5° to 50° C higher than the temperature of the first reaction zone, and the average specific surface area of the carrier in the second reaction zone being at least 10% greater than the average specific surface area of the carrier in the first reaction zone, with the average specific surface area of the carrier in the first zone being less than 3 m^2/g and the average specific surface area of the carrier in the second zone being less than 10 m^2/g.

3,992,464

HYDROPROCESSING AROMATICS TO MAKE CYCLOPARAFFINS

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application Jan. 12, 1976, Ser. No. 648,544

Int. Cl.² C07C *5/10*; C10G *13/04*; B01J *23/62*

U.S. Cl. 260—667 4 Claims

1. A process for producing a cycloparaffinic hydrocarbon which comprises contacting hydrogen and an aromatic hydrocarbon in a reaction zone, in contact with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.5 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, cobalt and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the tin is present in an oxidation state above that of the elemental metal, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions, and from about 0.01% to about 1.5% by weight of an alkalinous metal component, separating the resulting reaction zone effluent to recover said cycloparaffinic hydrocarbon.

3,992,465

PROCESS FOR MANUFACTURING AND SEPARATING FROM PETROLEUM CUTS AROMATIC HYDROCARBONS OF HIGH PURITY

Bernard Juguin; Georges Cohen, both of Rueil-Malmaison, and Paul Mikitenko, Chatou, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

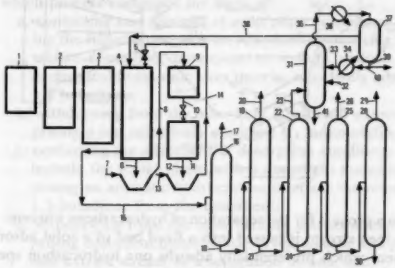
Filed Jan. 2, 1974, Ser. No. 430,157

Claims priority, application France, Jan. 10, 1973, 73.00806

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] C07C *5/36*

U.S. Cl. 260—668 D 7 Claims



1. A process for producing aromatic hydrocarbons in which a feed charge containing essentially paraffinic and naphthenic hydrocarbons and aromatic hydrocarbons is subjected to a treatment with hydrogen in at least two reaction zones in the presence of a catalyst, the inlet temperature of at least the last reaction zone traversed by the charge being from 570° to 600°C, the pressure from 1 to 60 kg/cm², the hourly flow rate by volume being from 0.1 to 10 times the catalyst volume and the molar ratio of the hydrogen to the hydrocarbons being from about 0.5 to 20, in which process the obtained products are made free from normally gaseous products and then subjected to at least one conventional fractionation so as to obtain a fraction containing essentially hydrocarbons having 4 and 5 carbon atoms per molecule, fractions or mixtures of fractions containing essentially at least one aromatic hydrocarbon selected from toluene, ethyl-benzene and xylenes, and aromatic hydrocarbons containing at least 9 carbon atoms per molecule, and a cut containing essentially, in addition to saturated hydrocarbons consisting essentially of 6 and/or 7 carbon atoms per molecule, a fraction selected from the benzene, toluene and benzene-toluene fractions, said process further comprising subjecting, in an extractive distillation zone, said cut to an extractive distillation in the presence of a suitable extraction solvent, recovering at the bottom of the extractive distillation column a mixture of the extraction solvent and at least one aromatic hydrocarbon, separating said aromatic hydrocarbon from the extraction solvent and recovering, at the top of the extractive distillation zone, a new cut containing non-aromatic products, said process further comprises subjecting said new cut containing the non-aromatic hydrocarbons consisting essentially of saturated hydrocarbons having 6 and/or 7 carbon atoms per molecule to a condensation, removing therefrom at least the major part of the extraction solvent contained therein and recycling at least one portion of the so-purified cut containing the said non-aromatic hydrocarbons towards the last one of the reaction zones, wherein the inlet temperature is comprised between 570° and 600°C, the catalyst of at least said reaction zone, to which said so-purified cut is recycled, containing at least two metals from group VI B, VII B or VIII of the periodic classification of elements, the concentration of each metal being comprised between 0.01 and 5% by weight.

3,992,466

HYDROCARBON CONVERSION

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, both of N.J., and Albert B. Schwartz, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,296

Int. Cl.[2] C10G *35/06, 13/02;* C07C *3/50*

U.S. Cl. 260—671 C 9 Claims

1. A process for hydrocarbon conversion which comprises contacting a containing a hydrocarbon charge under conversion conditions with a catalyst comprising a ZSM-35 crystalline zeolite characterized by an ultimate crystallite diameter of 0.005 to 0.1 micron as crystallized.

4. The process of claim 1 wherein said hydrocarbon conversion entails xylene isomerization.

3,992,467

PROCESS FOR ALKYLATING AROMATIC HYDROCARBONS AND CATALYST THEREFOR

George E. Stridde, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 503,985, Sept. 6, 1974. This application Mar. 29, 1976, Ser. No. 671,507

Int. Cl.[2] C07C *3/52*

U.S. Cl. 260—671 C 21 Claims

1. In a process for alkylating in the liquid phase an alkylatable aromatic hydrocarbon with an olefin-acting compound selected from the group consisting of mono-olefins, alkyl bromides, alkyl chlorides, and mixtures thereof, the improvement which comprises contacting said hydrocarbon and said compound under anhydrous alkylating conditions with a catalyst comprising a trioctahedral 2:1 layer-lattice smectite-type mineral containing a metallic cation having Pauling electronegativity greater than 1.0 in cation exchange positions on the surface of said mineral.

2. The process of claim 1 wherein said catalyst is selected from the group consisting of:

a. hectorite-type clays having the following structural formula:

$$\left[(Mg_{6-x}^{2+}\,Li_x^{+})^{VI}\,Si_8\,O_{20}(OH)_{4-y}\,F_y\right]\frac{x}{z}M^{z}$$

where

$0.33 \leq x \leq 1$

$0 \leq y \leq 4$

and

M is at least one metallic cation having a Pauling electronegativity greater than 1.0 of valence z;

b. stevensite-type clays having the following structural formula:

$$\left[(Mg_{6-x})^{VI}\,Si_8\,O_{20}(OH)_{4-y}F_y\right]\frac{2x}{z}M^{z}$$

where

$0.16 \leq x \leq 0.5$

$0 \leq y \leq 4$

and

M is at least one metallic cation having a Pauling electronegativity greater than 1.0 of valence z; and

c. saponite-type clays having the following structural formula:

$$\left[(Mg^{2+})^{VI}\ (Si_{4-x}\ Al_x^{3+})^{IV}\ O_{10}\ (OH)_{4-y}F_y\right]\frac{x}{z}\ M^z$$

where

$0.33 \leq x \leq 1$

$0 \leq y \leq 4$

and

M is at least one metallic cation having a Pauling electronegativity greater than 1.0 of valence z.

3,992,468

PROCESS FOR THE CATALYTIC HYDRODEALKYLATION OF ALKYLAROMATIC HYDROCARBONS

Jean Cosyns, Nanterre; Bernard Juguin; Jean-Francois Le Page, both of Rueil Malmaison, and Jean Miquel, Paris, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, Rueil-Malmaison, France

Filed Feb. 24, 1975, Ser. No. 552,278

Claims priority, application France, Mar. 1, 1974, 74.07340; Apr. 29, 1974, 74.15166; Sept. 9, 1974, 74.30692

Int. Cl.² C07C *3/58*

U.S. Cl. 260—672 R **26 Claims**

1. A process for the catalytic hydrodealkylation of alkylaromatic hydrocarbons, conducted at a temperature from 400° to 650° C in the presence of hydrogen, under a pressure from 1 to 40 kg/cm², with a spatial velocity from 1 to 10 and a ratio of the hydrogen to the hydrocarbon, expressed in moles by mole at the outlet of the reactor from 1 to 10, and in the presence of a catalyst selected from one of the catalysts A and B, in which:

catalyst A essentially contains:

a. a carrier,

b. at least one metal selected from a first group consisting of cobalt, ruthenium, osmium, palladium, rhodium, iridium and platinum, at a metal concentration from 0.05 to 20% by weight of catalyst when the selected metal is cobalt and from 0.05 to 5% by weight of the catalyst when the selected metal is chosen from the group consisting of ruthenium, osmium, palladium, rhodium, iridium and platinum,

c. at least one additional metal selected from a second group consisting of zinc, cadmium, gallium, indium, thallium, manganese, silver, gold, yttrium, titanium, niobium and tantalum, said metal being at a concentration from 0.05 to 5% by weight of the catalyst;

catalyst B contains essentially:

a. a carrier,

b. at least one metal selected from a first group consisting of chromium, molybdenum, tungsten, rhenium and manganese, the metal concentration being from 0.05 to 20% by weight of the catalyst.

c. at least one additional metal, said additional metal being chosen different from the selected metal of the first group, this additional metal being selected from the group consisting of chromium, molybdenum, tungsten, rhenium, manganese, copper, gold, zinc, cadmiun, gallium, indium, thallium, germanium, the metal concentration being from 0.05 to 20% by weight of the catalyst.

3,992,469

EFFLUENT FRACTIONATION IN SIMULATED MOVING-BED ADSORPTION PROCESSES

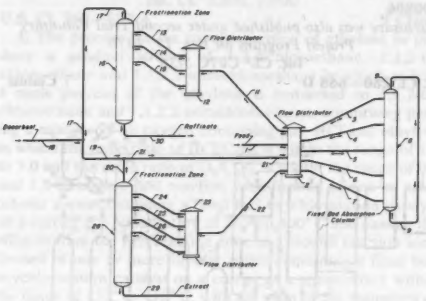
Clarence G. Gerhold, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Aug. 5, 1974, Ser. No. 494,944

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07C *7/12, 7/13*

U.S. Cl. 260—674 SA **8 Claims**



1. In a process for the separation of hydrocarbons wherein:

i. a feed stream is passed into a fixed bed of a solid adsorbent which preferentially adsorbs one hydrocarbon species contained in the feed stream;

ii. an extract-rich effluent stream and a raffinate-rich effluent stream are withdrawn from the bed of solid adsorbent;

iii. the points at which the feed stream enters the bed of solid adsorbent and at which the effluent streams are withdrawn are periodically moved in a unidirectional pattern which simulates the utilization of a moving-bed of the adsorbent by shifting the location of the adsorption and desorption zones within the adsorption column; and,

iv. the effluent streams are passed into fractionation zones;

the improvement which comprises passing each of the effluent streams through a flow distribution means which changes the locations at which the effluent stream enters the fractionation zone and effects a correlation of the composition of the effluent stream with the composition of the liquid contents of the fractionation zone at the respective location.

3,992,470

PRODUCT AND PROCESS

Jin Sun Yoo, South Holland, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 314,147, Dec. 11, 1972, Pat. No. 3,907,923, which is a division of Ser. No. 49,968, June 25, 1970, Pat. No. 3,725,306. This application Apr. 14, 1975, Ser. No. 567,774

Int. Cl.² C07C *3/10*

U.S. Cl. 260—680 B **18 Claims**

1. In a process for the polymerization of 1,3-conjugated dienes of 4 to about 12 carbon atoms, the improvement which comprises conducting the polymerization in contact with a catalytically-effective amount of a catalyst composition comprising:

a. a minor, catalytically effective amount of a nickel complex of the formula

$$(L)_mNi(CO)_n$$

wherein L is a tertiary, hydrocarbyl-substituted monodentate ligand of a Group V-A element, m is an integer value from 1 to 3 and n is an integer value of 1 to 4 the sum of m and n being 4; and

b. a major amount of an acidic, solid, silica-based support material as an essential catalyst component.

3,992,471

PROCESS FOR THE SEPARATION OF 1,3-BUTADIENE BY SELECTIVE ADSORPTION ON A ZEOLITE ADSORBENT

James William Priegnitz, Elgin, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 496,793, Aug. 12, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,196
Int. Cl.² C07C *7/00*
U.S. Cl. 260—681.5 R 15 Claims

1. A process for separating 1,3-butadiene from a feed mixture comprising 1,3-butadiene and at least one C_4 mono-olefin which process comprises the steps of:

a. contacting said mixture at adsorption conditions including the liquid phase with an adsorbent comprising type X zeolite containing potassium or sodium cations at the exchangeable cationic sites thereby selectively adsorbing 1,3-butadiene;
b. withdrawing from the adsorbent a raffinate stream comprising a less selectively adsorbed C_4 mono-olefin;
c. contacting the adsorbent at desorption conditions which include the liquid phase with a desorbent material comprising an aromatic hydrocarbon to effect the removal of 1,3-butadiene from the adsorbent;
d. withdrawing from the adsorbent an extract stream comprising desorbent material and 1,3-butadiene and passing said extract stream to a separation means; and
e. separating in said separation means, maintained at separating conditions, said desorbent material from 1,3-butadiene.

3,992,472

SYNTHESIS OF ETHYLENICALLY UNSATURATED COMPOUNDS FROM ALDEHYDES OR KETONES

Grant Wayne Urry, Winchester, Mass., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 18, 1975, Ser. No. 597,142
Int. Cl.² C07C *1/20*
U.S. Cl. 260—682 12 Claims

1. The process of reacting a metal compound of the formula

in which

Cp is a π-cyclopentadienyl group having up to one alkyl substituent of 1–10 carbons;
Q is alkyl of 1–10 carbons, aralkyl of 7–10 carbons or diarylmethyl of 13–21 carbons in which the β-carbon is not bonded to hydrogen;
M is niobium or tantalum;
R^1 and R^2 individually are hydrogen, tertiary alkyl of 4–10 carbons or aryl of 6–10 carbons;
a is 0 or 2;
d is 1 or 3; and
a plus d equals 3;

with an organic carbonyl compound of the group consisting of an aldehyde and a ketone, said carbonyl compound being free of Zerewitinoff-active hydrogen and any multiple bond present other than that in the carbonyl group being a carbon to carbon multiple bond or a multiple bond contained in an aromatic heterocyclic ring, at a temperature in the range of 0°–250° C, in the substantial absence of oxygen and moisture, to produce an ethylenically unsaturated compound.

3,992,473

PARAFFIN ISOMERIZATION IN THE PRESENCE OF ISOBUTANE OR ISOPENTANE AND A CATALYST OF ALUMINUM CHLORIDE INTERCALATED IN GRAPHITE

Paul Gerhard Rodewald, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 4, 1975, Ser. No. 565,181
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.² C07C *5/28*
U.S. Cl. 260—683.7 10 Claims

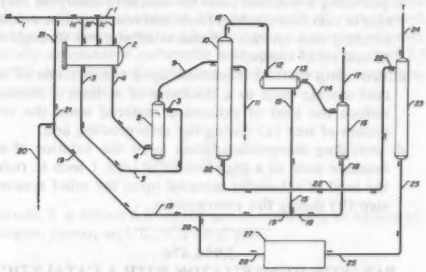
1. A process for effecting isomerization of a feedstock containing predominately normal paraffin hydrocarbons of 5 to 7 carbon atoms per molecule which comprises contacting said feedstock in a reaction zone, with between about 5 and about 60 weight percent of at least one compound selected from the group consisting of isobutane and isopentane and with a catalyst consisting essentially of graphite having intercalated in the lattice thereof between about 5 and about 55 weight percent of aluminum chloride, said reaction zone being maintained at a temperature between about 0° C. and about 200° C. and at a liquid hourly space velocity between about 0.2 and about 10 to yield a product containing isoparaffins of higher octane number than said normal paraffin hydrocarbons in said feedstock.

3,992,474

MOTOR FUEL PRODUCTION WITH FLUID CATALYTIC CRACKING OF HIGH-BOILING ALKYLATE

Jay E. Sobel, Highland Park, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 15, 1975, Ser. No. 641,120
Int. Cl.² C07C *3/54*, *3/56*
U.S. Cl. 260—683.48 10 Claims



1. A process for the production of a high octane paraffinic motor fuel which comprises:

a. alkylating isobutane with a high mono-olefin by contacting the olefin and isobutane with an alkylation catalyst at alkylation conditions in an alkylation zone to produce an alkylate product containing dimethylhexanes;
b. separating said alkylate into a low-boiling, high octane fraction and a high-boiling, low octane fraction characterized by a dimethylhexane content substantially higher than said high octane fraction and having an initial boiling point of about 100° to 110° C;
c. contacting at least a portion of said low octane fraction with a fluidized catalytic cracking catalyst in a fluidized catalytic cracking zone to produce isobutane and olefinic hydrocarbons, and;
d. passing at least a portion of the olefinic hydrocarbons and isobutane produced in the fluidized catalytic cracking zone to the alkylation zone.

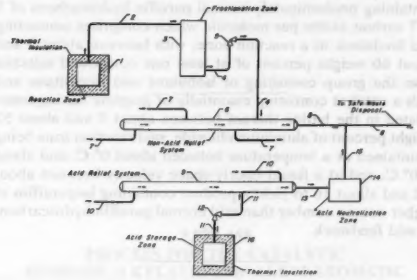
3,992,475
THERMAL INSULATIONS IN ACID-CATALYZED ALKYLATION PROCESS

Ernest Kanak, Jr., Missouri City, Tex., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 591,270, June 30, 1975, abandoned, which is a division of Ser. No. 483,999, June 28, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,445

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **4 Claims**



1. In a process for the acid-catalyzed alkylation of hydrocarbon feeds, which process includes relief valves and relief systems for collecting the exhausts from said relief valves, the improvement which consists of reducing the size of said relief systems, said process comprises the steps of:

a. providing an acid storage zone for the acid catalyst used in said alkylation, said acid storage zone communicating with one of said relief systems through one of said relief valves;

b. providing a reaction zone for said acid-catalyzed alkylation of said hydrocarbon feeds said reaction zone communicating with another of said relief systems through one of said relief valves;

c. providing thermal insulation upon the exterior of said acid storage zone to a thickness of at least 2 inches to reduce the load of exhausted material upon the relief system of step (a) during fire emergencies; and,

d. providing thermal insulation upon the exterior of said reaction zone to a thickness of at least 1 inch to reduce the load of exhausted material upon the relief system of step (b) during fire emergencies.

3,992,476
PARAFFIN ISOMERIZATON WITH A CATALYTIC COMPOSITE OF PLATINUM OR PALLADIUM METAL, RHODIUM METAL, TIN OXIDE, HALOGEN AND ALUMINA CARRIER

Richard E. Rausch, Mundelein, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 6, 1975, Ser. No. 584,438

Int. Cl.² C07C *5/30*

U.S. Cl. 260—683.68 **11 Claims**

1. A process for isomerizing an acyclic paraffin hydrocarbon which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 weight percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina, wherein substantially all of said platinum or palladium and said rhodium are present in the corresponding elemental metallic states and wherein substantially all of said tin is present in an oxidation state above that of the elemental metal.

3,992,477
PROTECTIVE COATING COMPOSITION

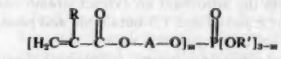
Ray A. Dickie, Birmingham, and Joseph C. Cassatta, Taylor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 31, 1974, Ser. No. 537,735

Int. Cl.² C08L *31/02*; C08F *8/00*

U.S. Cl. 260—827 **4 Claims**

1. In a coating composition polymerizable by ionizing radiation which, exclusive of non-polymerizable solvents, pigments, initiators and other nonreactive components, consists essentially of a solution of: (1) an alpha-beta olefinically unsaturated organic resin containing between about 0.5 and about 5 units of unsaturation per 1000 units of molecular weight; and (2) a vinyl compound polymerizable with said resin upon exposure to radiation, the improvement comprising including in said paint from about 1.0 to about 15.0 parts per 100 parts of the total of said organic resin and said compound polymerizable with said resin of a triester of phosphoric acid which bears one or more sites of vinyl unsaturation and has the formula:



where:

R=H, Cl or CH_3

A=C_nH_{2n}, 2 n 6

R′ = C_1 to C_4 alkyl or C_1 to C_4 chloro- or bromo-alkyl.

3,992,478
PAINT COMPOSITION DISPERSIBLE IN WATER AND WATER BASE PAINT

Minoru Kamosaki, and Sigeru Asai, both of Saitama, Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Aug. 26, 1974, Ser. No. 500,453

Claims priority, application Japan, Aug. 27, 1973, 48-95827

Int. Cl.² C08L *77/06, 23/06, 23/08*

U.S. Cl. 260—857 UN **6 Claims**

1. A powder composition adapted to be suspended in an aqueous medium to form a water-based paint, consisting essentially of: 100 parts by weight of a thermoplastic synthetic resin powder having a particle diameter in the range of about 0.1 to 250 μ, said synthetic resin being selected from the group consisting of nylon-11, nylon-12, nylon-6/12, nylon-6/66, nylon-6/66/610, nylon-6/66/12, polyethylene and ethylene-vinyl acetate copolymers; from 0.01 to 3 parts by weight of an additive selected from the group consisting of sodium polyacrylate and polyacrylamide; and from 3 to 15 percent by weight, based on the weight of sodium polyacrylate or polyacrylamide, of an acid selected from the group consisting of citric acid and succinic acid.

3,992,479
UNSATURATED POLYESTER WITH THERMOPLASTIC GRAFTS USING CALCIUM HYDROXIDE AS GELLING AGENT

Michael G. Roberts, Heath, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 3, 1974, Ser. No. 502,690

Int. Cl.² C08L *67/06, 9/08, 9/04*

U.S. Cl. 260—862 **16 Claims**

1. A moldable composition comprising:

a. an unsaturated, crosslinkable thermosetting resin;
b. an ethylenically unsaturated first monomer;
c. a thermoplastic resin soluble in said first monomer, said thermoplastic resin comprising the reaction product of a second monomer with a mixture comprising a styrene-butadiene copolymer and a polybutadiene polymer, said second monomer being reacted with both said styrene-butadiene copolymer and said polybutadiene polymer; and,
d. a gelling agent consisting essentially of calcium hydroxide in an amount sufficient to gell said composition to a viscosity at which said composition can be molded.

3,992,480

FIRE RETARDANT UNSATURATED POLYESTERS

Edwin Dorfman; Willis T. Schwartz, Jr., both of Grand Island, and Raymond R. Hindersinn, Lewiston, all of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 383,747, July 30, 1973, abandoned. This application June 6, 1975, Ser. No. 584,447

Int. Cl.² C08L *67/06;* **C08F** *283/00*

U.S. Cl. 260—863 **33 Claims**

1. An unsaturated polyester composition which is copolymerizable with an unsaturated monomer to form a fire retardant polymer composition, said unsaturated polyester composition comprising an α,β-ethylenically unsaturated polyester of a polycarboxylic compound and a polyhydric alcohol, which contains halogen in a proportion of greater than about 4.4 weight percent, and about 0.55 to about 50 weight percent of copper or a copper compound.

2. A copolymerizable mixture of an unsaturated polyester composition and a copolymerizable ethylenically unsaturated monomer capable of copolymerization to form a fire retardant polymer composition, said unsaturated polyester composition comprising an α-,β-ethylenically unsaturated polyester of a polycarboxylic compound and a polyhydric alcohol, which contains halogen in a proportion of greater than about 4 weight percent, and an effective fire retardant proportion of about 0.5 up to about 5 weight percent of copper or a copper compound, wherein said proportions are based on the weight of unsaturated polyester and copolymerizable unsaturated monomer.

3,992,481

FIRE RETARDANT THERMOPLASTIC POLYMER COMPOSITIONS

Paul Kraft, Spring Valley, and Siegfried Altscher, Monsey, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 333,595, Feb. 20, 1973, Pat. No. 3,857,906, which is a division of Ser. No. 49,204, June 23, 1970, Pat. No. 3,725,509. This application Oct. 31, 1974, Ser. No. 519,486

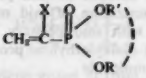
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 **8 Claims**

1. A fire retardant, thermoplastic polymer composition comprising an intimate admixture of a polyester resin formed by condensation of a dibasic acid with a dihydric alcohol and an effective concentration to render said polymer composition flame retardant of a copolymer of:

1. at least one halogen containing, ethylenically unsaturated monomer selected from the group consisting of vinyl halides, vinylidene halides, chlorinated styrenes, halogenated C_1-C_{12} alkyl acrylates, and methacrylates and halo-substituted nitriles of ethylenically unsaturated carboxylic acids; and
2. from about 2.5 to 99%, by weight of at least one bis(hydrocarbyl) vinylphosphonate having the structure:



wherein X is selected from the group consisting of hydrogen, halogen, cyano, aryl, C_1–C_{18} alkyl and

wherein R and R′ are hydrocarbyl and substituted hydrocarbyl groups which can be the same, different or conjoint.

3,992,482

FIRE RETARDANT THERMOPLASTIC POLYMER COMPOSITIONS

Paul Kraft, Spring Valley, and Siegfried Altscher, Monsey, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

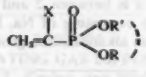
Division of Ser. No. 308,881, Nov. 22, 1972, Pat. No. 3,819,770, which is a division of Ser. No. 49,204, June 23, 1970, Pat. No. 3,725,509. This application Apr. 15, 1974, Ser. No. 461,184

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C08L *51/00, 53/00*

U.S. Cl. 260—876 R **8 Claims**

1. A fire retardant, thermoplastic polymer composition, comprising an intimate admixture of: (a) an acrylonitrile-butadiene-styrene resin and (b) a concentration effective to provide fire retardancy of a copolymer of: (1) at least one halogen containing, ethylenically unsaturated monomer selected from the group consisting of vinyl halides, vinylidene halides, chlorinated syrenes, halogenated C_1–C_{12} alkyl acrylates and methacrylates and halo-substituted nitriles of ethylenically unsaturated carboxylic acids and (2) from about 2.5 to 99%, by weight, of at least one bis(hydrocarbyl) vinylphosphonate having the structure:



wherein X is selected from the group consisting of hydrogen, halogen, cyano, aryl, C_1–C_{18} alkyl and

wherein R and R′ are hydrocarbyl and substituted hydrocarbyl groups which can be the same, different or conjoint.

3,992,483

PROMOTERS IN THE POLYMERIZATION OF MONOVINYL-AROMATIC COMPOUNDS WITH PRIMARY LITHIUM INITIATORS

Daniel H. Willis, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 25, 1975, Ser. No. 616,534

Int. Cl.² C08F *293/00, 297/04*

U.S. Cl. 260—878 B **16 Claims**

1. The process which comprises polymerizing at least one first monovinyl-substituted aromatic compound monomer with a primary hydrocarbyl lithium polymerization initiator and a 1,1-dialkyl-ethylene promoter under solution polymerization conditions of temperature and pressure, wherein said

process employs an amount of said promoter effective to promote said polymerization of said monovinyl-substituted aromatic monomer with said primary hydrocarbyl lithium initiator, and said 1,1-dialkylethylene promoter contains up to 8 carbon atoms per molecule,

adding a polymerizable conjugated diene monomer to said polymerization prior to termination and after substantially complete conversion of said first monomer, and polymerizing said conjugated diene monomer to substantially complete conversion,

and thereafter prior to termination adding a second monovinyl-substituted aromatic compound monomer to said polymerization and polymerizing said second monovinyl aromatic compound monomer thereby preparing an A—B—A block copolymer, wherein each A represents a block of polymerized monovinyl-substituted aromatic compound, and said B represents said block of polymerized conjugated diene, and wherein a weight ratio A—B—A of about 5—90—5:25—50—25 is represented.

3,992,484

PROCESS FOR PREPARING HIGH-IMPACT VINYL AROMATIC POLYMERS

William J. I. Bracke, Hamme, and Bernard M. J. Haveaux, Nivelles, both of Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed June 30, 1975, Ser. No. 591,481
Int. Cl.² C08L 9/08
U.S. Cl. 260—880 R **10 Claims**

1. A process for preparing high-impact vinyl aromatic polymers comprising:

a. mass pre-polymerizing vinyl aromatic hydrocarbon in the presence of from about 2 to 30%, based upon the weight of said monomer, diene rubber, said prepolymerization being continued until about 5 to 40% of said monomer is polymerized to provide a pre-polymerization product, and

b. suspension polymerizing said pre-polymerization product in the presence of hydroxyapatite and of at least one ethoxysulphate of the formula $RO(C_3H_4O)_x\ SO_3M$, wherein R is selected from the group consisting of alkyl radicals having from 10 to 16 carbon atoms and alkylphenyl radicals having an alkyl substituent of from 8 to 12 carbon atoms, x is between 2 and 6, and M is selected from the group consisting of Na, K. N, NH_4, an amine group, and of an alkanolamine group.

3,992,485

PROCESS FOR PREPARATION OF WEATHER RESISTANT AND IMPACT RESISTANT RESINS

Takumi Kosugi; Shigeki Yasunaga, both of Kobe, and Takashi Motoki, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 324,818, Jan. 18, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,340
Claims priority, application Japan, Jan. 27, 1972, 47-10302
Int. Cl.² C08L 33/08
U.S. Cl. 260—881 **9 Claims**

1. A process for preparing resins having the properties of weather resistance and impact resitance, comprising the steps of

A. emulsion copolymerizing 100 to 80% by weight of an alkyl acrylate having alkyl group containing 2 to 8 carbon atoms, 0 to 20% by weight of a monomer containing a vinylidene group copolymerizable therewith in the presence of 0.05 to 1% by weight of one or more emulsifiers, and 0.01 to 5% by weight of cross-linking monomer, whereby the amount of said emulsifier and cross-linking monomer are adjusted to thereby produce an aqueous dispersion of cross-linked copolymer having a degree of swelling above 10, a gel content above 80% and an average particle diameter of 0.15 to 0.5 micron; and

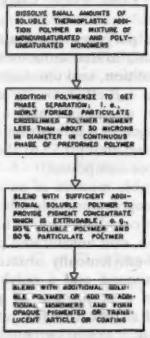
B. polymerizing in the presence of 5 to 50 parts by weight of solid of said cross-linked copolymer in an aqueous dispersion, 50 to 95 parts by weight of a monomer mixture consisting essentially of at least 50% by weight of an aromatic vinyl monomer and less than 50% by weight of an unsaturated nitrile copolymerizable therewith.

3,992,486

PROCESS FOR ALTERING APPEARANCE OF POLYMER BY INCORPORATING THEREIN CROSSLINKED PARTICULATE POLYMERS PREPARED BY ENDOPOLYMERIZATION

E. Reed Lang, Glenside, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 113,841, Feb. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 74,250, Sept. 22, 1970, abandoned. This application June 21, 1973, Ser. No. 372,382
Int. Cl.² C08L 31/02, 51/00
U.S. Cl. 260—885 **9 Claims**


DISSOLVE SMALL AMOUNTS OF SOLUBLE THERMOPLASTIC ADDITION POLYMER IN MIXTURE OF MONOUNSATURATED AND POLYUNSATURATED MONOMERS
ADDITION POLYMERIZE TO GET PHASE SEPARATION, I. e., NEWLY FORMED PARTICULATE CROSSLINKED POLYMER PIGMENT LESS THAN ABOUT 30 MICRONS IN DIAMETER IN CONTINUOUS PHASE OF PREFORMED POLYMER
BLEND WITH SUFFICIENT ADDITIONAL SOLUBLE POLYMER TO PROVIDE PIGMENT CONCENTRATE WHICH IS EXTRUDABLE, e. g., 50% SOLUBLE POLYMER AND 50% PARTICULATE POLYMER
BLEND WITH ADDITIONAL SOLUBLE POLYMER OR ADD TO ADDITIONAL MONOMERS AND FORM OPAQUE PIGMENTED OR TRANSLUCENT ARTICLE OR COATING

1. A process for the preparation of a finely divided particulate polymer and modifying the appearance of plastic sheets, films, and the like therewith comprising the steps of:

I. providing a monomer system (1) capable of free radical addition polymerization comprising:

A. 87 to 99.99 percent by weight of a monoethylenically unsaturated monomer, based on total monomer weight,

B. 0.01 to 3 percent by weight of at least one polyunsaturated monomer, based on total monomer weight;

II. placing into essentially complete solution in said monomer system, 5 to 50 percent by weight of the total mixture, of a soluble thermoplastic addition polymer (2), said polymer (2) resulting from at least one different monomer than those of monomer system (1), the polymer from the monomer mixture being insoluble in the thermoplastic polymer;

III. subjecting the solution of (1) and (2) to conditions that will free-radical polymerize the monomer system to form essentially spherically shaped crosslinked polymer particles, said particles having an average diameter in the range of 0.5 to 30 microns dispersed in a continuous phase of polymer (2), said particles being insoluble in said addition polymer (2); and

IV. adding the resultant concentrate of particles to addition polymerized monomers, in which the crosslinked particles are insoluble, the refractive index of the polymer particles being such as to obtain a product having an opaque, pigmented, or flatted appearance different than would be the case absent said polymer particles.

3,992,487

DEGRADABLE PLASTICS COMPOSITIONS CONTAINING A TRANSITION METAL COMPLEXED WITH A 1,3-DICARBONYL GROUP CONTAINING POLYMER

Heinz-Peter Hemmerich; Hans Jürgen Rosenkranz, and Hans Rudolph, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Oct. 25, 1974, Ser. No. 517,962

Claims priority, application Germany, Oct. 31, 1973, 2354534; Oct. 31, 1973, 2354535

Int. Cl.² C08J *3/20*

U.S. Cl. 260—896 **9 Claims**

1. A composition comprising a mixture of (A) a plastic selected from the group consisting of polyolefins and polystyrene and (B) a polymer containing 1,3-dicarbonyl groups complexed with a transition metal of an atomic number from 21 to 30, 39 to 48 or 59 to 79, said (B) containing said complexed transition metal in an amount of from 0.1 ppm to 6% by weight, based on the weight of (B), and being present in an amount to provide a composition having a transition metal content of from 0.1 to 25,000 ppm.

3,992,488

1-PHOSPHOROSEMICARBAZIDES

Richard J. Turley, and Richard L. Doerr, both of Orange, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed July 25, 1975, Ser. No. 599,056

Int. Cl.² C07F *9/02*

U.S. Cl. 260—923 **5 Claims**

1. A composition of matter comprising a phosphorosemicarbazide having the formula:

wherein each R is selected from the group consisting of alkyl having 1–4 carbons and haloalkyl having 1–4 carbons wherein the halogen component is selected from the group consisting of bromine and chlorine.

3,992,489

POLYALKYLENE GLYCOL VINYL PHOSPHATES

Kyung S. Shim, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 389,607, Aug. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 63,262, Aug. 6, 1970, abandoned. This application Sept. 6, 1974, Ser. No. 502,993

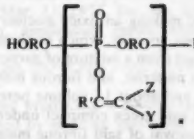
The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

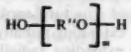
Int. Cl.² C07F *9/11*; **C08J** *9/00*

U.S. Cl. 260—929 **7 Claims**

1. Polyalkylene glycol vinyl phosphates having the formula:



where R is a polyalkylene glycol residue obtained by removing two hydroxyl groups from a polyalkylene glycol having the formula



where R'' is an alkylene group of from 2 to about 20 carbon atoms, and m is from 2 to about 20, *n* is an integer from 1 to about 100, R' is selected from the group consisting of hydrogen, alkyl and haloalkyl, Z and Y are each selected from the group consisting of halogen, hydrogen and alkyl, provided Z and Y are not both hydrogen or alkyl.

3,992,490

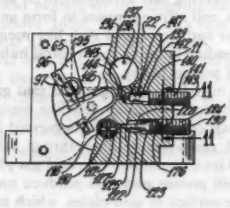
METHOD AND MEANS OF ADJUSTMENT CONTROL FOR CHARGE FORMING APPARATUS

Walter P. Preston, Toledo, Ohio, assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 3, 1972, Ser. No. 277,637

Int. Cl.² F02M *17/04*

U.S. Cl. 261—41 D **31 Claims**



1. The method of retaining a relatively movable first member in adjusted positions with respect to a second member of a charge forming apparatus including forming a space in one of the members adjacent the other of the members, inserting in the space a substantially spherically-shaped deformable body loosely disposed in the space and in a position to effect interference with the other of said members, and moving the first member relative to the second member to engage and deform the spherically-shaped body establishing substantial friction effective to retain the relatively movable member in adjusted positions.

3,992,491

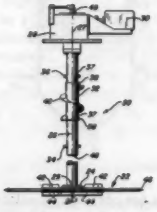
ROTATING GAS DIFFUSER

David C. Ihrig; Jack L. Cooley, and Michael W. Boex, all of Littleton, Colo., assignors to FMC Corporation, Chicago, Ill.

Filed Sept. 30, 1975, Ser. No. 618,080

Int. Cl.² C02C *5/04*

U.S. Cl. 261—87 **42 Claims**



33. A rotatable disk like member for use in a rotating gas diffuser for shearing fine gas bubbles from the surface of said disk like member when it is immersed in a body of liquid and rotated therein, which comprises:

a hollow central hub plate, said hub plate defining an inlet for the gas to be introduced into said body of liquid;

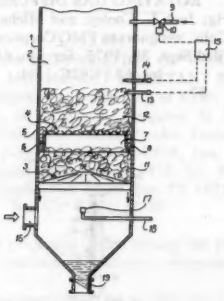
at least three main rigid structural spokes;
means for affixing said structural spokes to said central hub plate in positions extending radially outward therefrom;
gas conduit means extending radially outward from said central hub plate to carry gas outward from said gas inlet;
a plurality of porous plates carried by said arrangement of main structural spokes and radially extending gas conduits on at least one of the top and bottom of said rotatable disk like member, each of said porous plates having the shape of a section of an annulus with its lateral edges aligned radially with said disk like member;
means defining a gas plenum underlying each of said porous plates on the surface of said rotatable disk like member, each of said gas plenums extending only through an area substantially equal to the area of its associated porous plates on at least one of the top and bottom of said disk like member;
feed line means to carry gas from said radially extending hollow gas conduit means to the gas plenum underlying each of said porous plates; and
skin means covering said arrangement of spokes, gas conduit means, and affixing means to form an upper surface and a lower surface of said disk like member, said skin means extending between said central hub plate and said plurality of porous plates,
whereby the introduction of gas into said gas inlet in said central hub plate, when the disk like member is rotating about its axis of rotation while immersed in said body of liquid, will cause gas to flow throgh said gas conduit means and feed line means into said gas plenums and out through said porous plates to produce nascent gas bubbles on the surface of said plates, which nascent bubbles are sheared off by the viscous shear forces exerted by said liquid as the disk like member rotates in said body of liquid.

3,992,492

APPARATUS FOR CONTACTING A GAS AND A LIQUID

Kurt Yngve Vikholm, Norsborg, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed July 7, 1975, Ser. No. 593,489
Claims priority, application Sweden, July 8, 1974, 74089251; Sept. 9, 1974, 74113416
Int. Cl.² B01F 3/04
U.S. Cl. 261—110 9 Claims



1. In an apparatus for obtaining contact between a gas and a liquid, the combination of means forming a vertical channel, means for introducing said gas into the channel for through-flow of the gas upwards from below, a device for charging the channel with a foam containing said liquid, and upper and lower gas-permeable elements spaced from each other in said channel and each arranged to support a layer of said foam covering the through-flow area of the channel, said elements being formed to cause turbulence of the gas flowing therethrough and being located so close to each other that foam will be entrained by the flowing gas from the space between said elements upwardly through the upper element to the upper side thereof, said channel-forming means at least partly forming also a passage for returning foam from said upper side of the upper element to the space between the elements, said passage being shielded from upward flow of gas therethrough, whereby a foam column present in said passage can move downward.

3,992,493

BEVERAGE CARBONATION

David D. Whyte, Wyoming, and Ronald L. Sampson, Forest Park, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 302,149, Nov. 30, 1972, Pat. No. 3,888,998, which is a continuation-in-part of Ser. No. 200,849, Nov. 22, 1971, abandoned. This application July 15, 1974, Ser. No. 488,594
Int. Cl.² B01F 3/04
U.S. Cl. 261—121 R 21 Claims

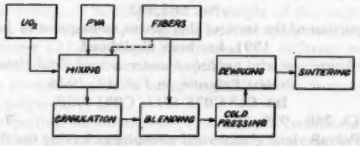
1. A carbonated beverage carbonation device which comprises a water and gas permeable container, a quantity of porous crystalline aluminosilicate material, and an amount of carbon dioxide equal to at least about 5% by weight of said crystalline aluminosilicate material; said crystalline aluminosilicate material being enclosed in said container; said carbon dioxide being adsorbed on said crystalline aluminosilicate material; whereby when said device is submerged in a body of beverage-making liquid to be carbonated, said adsorbed carbon dioxide is released to provide beverage carbonation.

3,992,494

METHOD OF MAKING AN OXIDE FUEL COMPACT

Robert B. Holden, Scarsdale, N.Y., assignor to General Atomic Company, San Diego, Calif.

Filed May 28, 1974, Ser. No. 473,481
Int. Cl.² G21C 21/12
U.S. Cl. 264—.5 9 Claims



1. A method of making an oxide nuclear fuel compact of predominantly open porosity, which method comprises forming a green compact from a mixture of particulate nuclear fuel oxide and fibrous material, said fibrous material constituting between about 5 and about 15 volume percent of said green compact, heating said green compact under conditions sufficient to cause removal of said fibrous material, and heating said compact to a sintering temperature for a sufficient length of time to sinter said particulate nuclear fuel oxide to a strong, open-pore structure having a density between about 88 and 96

percent of theoretical density, which sintered compact is resistant to in-reactor sintering.

3,992,495

METHOD OF MANUFACTURING A SEMIPERMEABLE MEMBRANE FROM A WATER-SOLUBLE POLYMERIC RESIN

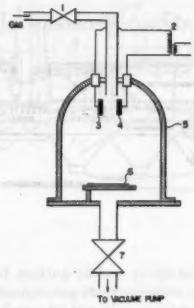
Takezo Sano, Takatsuki; Takatoshi Shimomura, Toyonaka, and Masao Sasaki, Ibaragi, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sept. 6, 1974, Ser. No. 503,701

Claims priority, application Japan, Sept. 7, 1973, 48-101417; May 23, 1974, 49-58578

Int. Cl.² B29C *25/00*; B29D *27/00*

U.S. Cl. 264—22 **11 Claims**



1. A method for maufacturing a semipermeable membrane for separating substances, which comprises

exposing a shaped article of a water-soluble polymer or of a mixture of a water-soluble polymer and a water-insoluble polymer wherein the ratio of the water-soluble polymer to the water-insoluble polymer is 1 to 0.1–0.3 by weight to a plasma of a gas selected from the group consisting of helium, argon, nitrogen, hydrogen, oxygen, carbon monoxide, carbon dioxide, ammonia, a hydrocarbon having 1 to 10 carbon atoms, an epoxide having 2 to 10 carbon atoms, an alkylamine, or a mixture thereof to crosslink the surface layer of the shaped article, and then removing the uncrosslinked portions by washing with water to form said semipermeable membrane.

3,992,496

PROCESS FOR PRODUCING POROUS THERMOPLASTIC RESIN SHEET

Hiroomi Matsunaga, Kobe; Kozo Tsuji, and Masashi Watanabe, both of Ibaragi, all of , Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan

Filed Mar. 13, 1975, Ser. No. 557,990

Claims priority, application Japan, Mar. 15, 1974, 49-30209

Int. Cl.² B29D *27/00*, *7/14*

U.S. Cl. 264—49 **5 Claims**

1. A process for producing a porous thermoplastic resin sheet, characterized by molding into a sheet a mixture comprising 100 parts by weight of a thermoplastic resin and 0.1 to 50 parts by weight of a pullulan powder, and then immersing the thermoplastic resin sheet in water to dissolve-out and remove the said pullulan powder.

3,992,497

PRESSURELESS SINTERING SILICON NITRIDE POWDERS

Gerald R. Terwilliger, Aspen, Colo., and Frederick F. Lange, Murrysville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 361,754, May 18, 1973, abandoned. This application July 25, 1974, Ser. No. 491,917

Int. Cl.² C04B *33/32*, *35/58*

U.S. Cl. 264—56 **3 Claims**

1. A method of sintering and densifying silicon nitride powder into a predetermined configuration, the steps comprising,

a. providing silicon nitride powder with between about ½% and 10% by weight of MgO powder mixed therewith,

b. forming said mixture to the desired shaped article,

c. heating said shaped powder article in the absence of applied pressure to a temperature of about 600° C for a time period of about 60 minutes,

d. increasing the temperature to the sintering/densification temperature within the range between about 1500° and 1750° C said heating to the sintering/densification temperature above 1450° C being at a rate between about 15C°/minute and about 200C°/minute,

e. holding said article at the sintering/densification temperature for a time period between about 5 minutes and 30 minutes to cause densification to occur, and

f. thereafter rapidly cooling the outside to a temperature below about 1450° C said cooling rate being between about 15C°/minute and about 35C°/minute.

3,992,498

REFRACTORY FIBER PREPARATION WITH USE OF HIGH HUMIDITY ATMOSPHERE

Michael John Morton; James Derek Birchall, and John Edward Cassidy, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 152,429, June 11, 1971. This application Oct. 11, 1973, Ser. No. 406,321

Claims priority, application United Kingdom, June 19, 1970, 29909/70

Int. Cl.² B28B *3/26*

U.S. Cl. 264—63 **38 Claims**

1. A process for the preparation of a fibre comprising the steps of:

a. providing a fibrizing composition comprising an aqueous polar solvent solution of a metal compound and a water-soluble organic polymer, wherein the molecular weight of the polymer is from 10^5 to 10^7, the viscosity of the solution is from 1 to 100 poise, the metal of the said metal compound is selected from the group consisting of aluminum, iron, zirconium, titanium, beryllium, chromium, magnesium, thorium, uranium, yttrium, nickel, vanadium, manganese, molybdenum, tungsten and cobalt, and the proportion by weight of the metal compound is greater than the proportion by weight of the organic polymer;

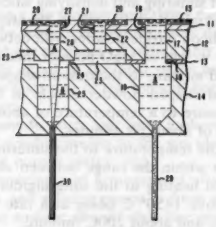
b. extruding the said fibrizing composition through one or more apertures into at least two gas streams which have vapour of the said solvent mixed therewith to produce a relative humidity of at least 80%, said gas streams having a component of high velocity in the direction of travel of the extruded fibrizing composition and said gas streams converging at or near the point where the fibrizing composition is extruded from the apertures, whereby discontinuous lengths of fibres are produced; and

c. removing at least part of the said polar solvent from the fibre thereby formed.

3,992,499
PROCESS FOR SHEATH-CORE COSPUN HEATHER YARNS

Lin-Fa Lee, Chattanooga, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 15, 1974, Ser. No. 442,905
Int. Cl.² D01F *1/04;* B29F *3/10*
U.S. Cl. 264—78 6 Claims

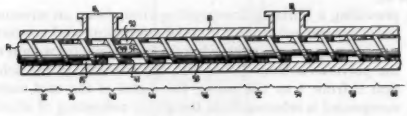


1. In a process for the manufacture of a cospun heather yarn which comprises feeding at least two molten, synthetic, thermoplastic, fiber-forming polymer compositions selected from the group consisting of polyamides and polyesters to a common spinning assembly, said polymer compositions having substantially different receptivities for a first class of dyes and a common receptivity for a second class of dyes, the improvement by which the weight ratio of the two polymer compositions in the yarn is apparently changed which comprises spinning a portion of one composition into a first group of filaments and spinning the remainder of that composition into the core of a second group of cospun filaments having a substantially concentric sheath-core structure, with the other polymer composition as the sheath, the core being a minor component by weight of said sheath-core filament, and combining said groups of filaments into a composite yarn.

3,992,500
VENTED EXTRUDER

George A. Kruder, and Russell J. Nichols, both of Marion, Ohio, assignors to Koehring Company, Milwaukee, Wis.

Filed June 7, 1974, Ser. No. 477,370
Int. Cl.² B29B *1/04, 1/06*
U.S. Cl. 264—102 15 Claims



9. A process for removing volatiles from synthetic resinous material flowing through a rotary screw extruder comprising:

metering the flow rate of pressurized synthetic resinous material into one end of an elongated gas removal zone extending along the length of the rotary screw;

pressure sealing both ends of the gas removal zone;

connecting a source of reduced pressure to each end of the gas removal zone;

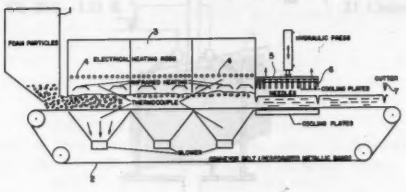
working the synthetic resinous material helically flowing through the gas removal zone in at least one region located between the ends of the gas removal zone; and

providing the gas removal zone with a flow capacity exceeding said metered flow rate to ensure that a helical free surface exists throughout said gas removal zone so that gas liberated upon the working of the synthetic resinous material may be drawn off by the source of reduced pressure.

3,992,501
PROCESS FOR THE MANUFACTURE OF VOID-FREE POLYOLEFIN FOAM MOLDINGS

Hermann Tatzel, Leutershausen; Wolfram Koegel, Mannheim; Gilbert Beck, Ludwigshafen; Ludwig Zuern, Bad Durkheim, and Arndt Christian Caesar, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed June 18, 1974, Ser. No. 480,405
Claims priority, application Germany, June 20, 1973, 2331302
Int. Cl.² B29D *27/00;* B29F *5/02*
U.S. Cl. 264—126 2 Claims



1. A process for the manufacture of void-free foam moldings from olefin polymers which comprises:

differentially heating foamed cross-linked particles of an olefin polymer to the temperature at which they sinter or coalesce together in a mold which is not gas-tight when closed, said particles being heated in said mold so that a temperature gradient of 0.5° to 25° C per cm of the loose mass of particles is established in the mold which has a gas-permeable wall on the lower-temperature side;

compressing said heated particles having said temperature gradient in said mold to bond the particles together and form a void-free foam article;

cooling said compressed article and removing the foamed article from said mold.

3,992,502
METHOD FOR USING MOLD RELEASE

Ram M. Krishnan, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 28, 1972, Ser. No. 248,361
Int. Cl.² B29C *1/04*
U.S. Cl. 264—129 2 Claims

1. A method of manufacturing shaped polyurethane articles having a paint coat, comprising coating a mold with a release agent comprising 1 to 5 percent by weight of a soap having the structure $C_nH_{2n-1}COOM$, where N is an integer having values of 11 to 22 and M is sodium or potassium ion, and 99 to 95 percent by weight of a diluent consisting of alcohol or alcohol and water with the amount of water varying from 0 to 24 percent by weight and the alcohol being selected from the group consisting of methanol and ethanol, adding a polyurethane reaction mixture to the mold and allowing it to react and cure, stripping the molded article from the mold, flushing the shaped polyurethane article with water at 40° C. to 95° C. to remove soap, drying the article and then applying a paint coat of 3 to 10 mils over the polyurethane article and drying the paint coat on said article.

3,992,503

METHOD OF INJECTION MOLDING PIPE

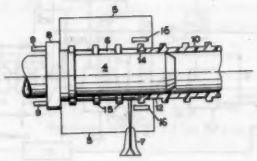
Basil Henfrey, Kloof, and Kenneth R. Hart, Durban, both of South Africa, assignors to Duropenta Holdings (Proprietary) Limited, New Germany, Natal, South Africa

Continuation-in-part of Ser. No. 359,125, May 10, 1973, abandoned. This application May 16, 1975, Ser. No. 578,333

Claims priority, application South Africa, June 4, 1974, 74/3527

Int. Cl.[2] B29D *23/02*, *23/08*

U.S. Cl. 264—167 14 Claims



1. A method of making ribbed synthetic resin pipe in a stepwise manner, comprising the successive steps of: (a) forming a first length of pipe by injection moulding synthetic resin in a cavity between a male mould element and plural female mould elements, one end of said cavity being closed by a plunger and said female mould elements being configured so as to form integral ribs on an outer surface of said pipe; (b) disengaging said female mould elements from said first length of pipe; (c) advancing and guiding said plunger along said male mould element to partially eject said length of pipe from between said female mould elements; (d) retracting said plunger to close an end of said cavity; (e) engaging an end of said length of pipe between said male mould element and said female mould elements thereby closing a second end of said cavity opposite said plunger; (f) injecting further resin into said cavity to form a further length of pipe and homogeneously welding said further resin to an end of the partially ejected length of pipe; (g) repeating steps b-f to form pipe of desired length.

3,992,504

PROCESS FOR PRODUCING WET SPUN OR SHAPED STRUCTURES

Josef Studinka, and Rudolf Gabler, both of Zurich, Switzerland, assignors to Inventa AG fur Forschung und Patentverwertung, Zurich, Switzerland

Continuation of Ser. No. 431,466, Jan. 7, 1974, abandoned. This application July 23, 1975, Ser. No. 598,535

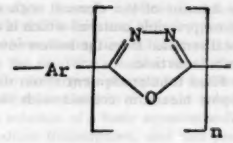
Claims priority, application Switzerland, Jan. 16, 1973, 556/73

Int. Cl.[2] D01F *6/00*

U.S. Cl. 264—184 7 Claims

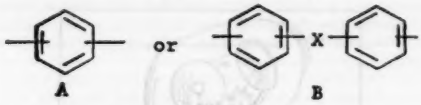
1. A process for preparing a shaped structure such as a fiber, film or strip of an aromatic poly-(1,3,4-oxadiazole) which consists essentially of:

a. preparing a polymer of an aromatic 1,3,4-oxadiazole, said polymer comprising at least 90 percent of the repeating structural formula I



I

in which Ar is a radical of the formula



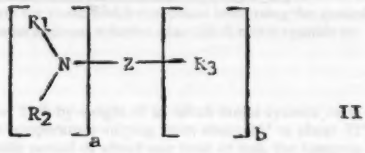
A B

the benzene rings of A and B being substituted or unsubstituted, the linking bonds of structure A being m- or p- to each other and those of B being m- or p- to X, X being —SO_2— or —CO— and *n* being 1 or 2;

b. dissolving said polymer in concentrated sulfuric acid;

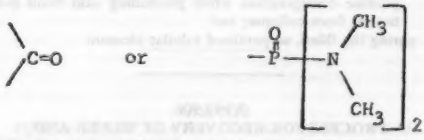
c. forming the dissolved polymer into a shaped structure;

d. passing the thus-formed structure into a bath which consists essentially of at least one liquid of the formula



II

in which R_1 and R_2, same or different, are alkyl groups having 1 to 4 carbon atoms, R_3 being H or an alkyl group having 1 to 4 carbon atoms, or R_1 together with R_2 or R_3 being a divalent alkylene radical, the total number of carbon atoms in R_1, R_2 and R_3 being not more than 8; Z being



a being 1 or 2, *b* being 0 or 1 and the sum of $a + b$ being equal to the valence of Z said bath containing below about 5% water; and

e. recovering the shaped structure.

3,992,505

METHOD FOR PRODUCING CURVED ELASTOMERIC TUBULAR ARTICLES

David N. Tally, Arvada, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Aug. 18, 1975, Ser. No. 605,585

Int. Cl.[2] B29H *5/18*

U.S. Cl. 264—295 14 Claims

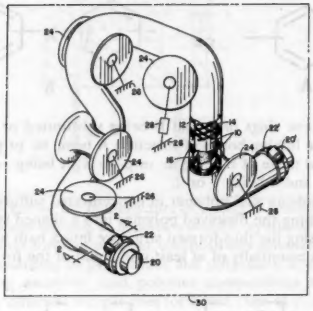
1. A method for producing elastomeric tubular articles of a predetermined fixed serpentine configuration having at least one bend portion, comprising:

preparing a flexible, at least partially uncured length of an elastomer tubular element;

filling the hollow interior of the element with a flowable substantially incompressible material which is capable of substantially total removal from the hollow interior upon curing of the tubular article;

training the thus filled tubular element about discrete unconnected support means in contact with the exterior surface of the tubular element at spaced positions along its length and intermediate the ends, in a manner so as to dispose the tubular element in substantially its said serpentine configuration while precluding said bend portion(s) from collapse; and

curing the filled, serpentined tubular element.



3,992,506

PROCESS FOR RECOVERY OF SILVER AND REGENERATION OF 2-MERCAPTOPYRIDINE-1-OXIDE

Haywood Hooks, Jr., West Haven, and James J. Pitts, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed June 23, 1975, Ser. No. 589,293
Int. Cl.² C01G *5/00*
U.S. Cl. 423—42 **7 Claims**

1. A process for recovering silver from an aqueous system contaminated therewith with 2-mercaptopyridine-1-oxide and for recovering the 2-mercaptopyridine-1-oxide which comprises:

a. adding 2-mercaptopyridine-1-oxide to an aqueous system contaminated with silver to form an insoluble silver salt of 2-mercaptopyridine-1-oxide and separating said silver salt from said system;

b. reacting said silver salt with hydrochloric acid at a temperature in the range of 15° C.–100° C.;

c. separating the resulting precipitate from the reaction mixture; and

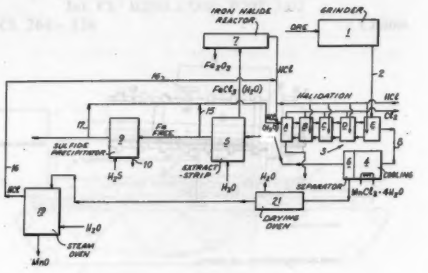
d. neutralizing the resulting liquid phase of said reaction mixture to a pH in the range of 3 to 5 and recovering 2-mercaptopyridine-1-oxide.

3,992,507

HALIDATION OF MANGANIFEROUS ORE TO OBTAIN METAL VALUES AND RECOVERY AND RECYCLE OF HALIDE VALUES

Paul H. Cardwell, Zanoni, and William S. Kane, Wicomico, both of Va., assignors to Deepsea Ventures, Inc., Gloucester Pt., Va.

Continuation-in-part of Ser. No. 336,547, Feb. 28, 1973, Pat. No. 3,832,165. This application Apr. 26, 1974, Ser. No. 464,550
Int. Cl.² C01G *45/02*
U.S. Cl. 423—51 **39 Claims**



1. A process for the preparation of relatively pure manganese oxide from manganese oxide ore, the ore comprising manganese and iron values, the process comprising 1) halidating the ore with a hydrogen halide selected from the group consisting of hydrogen chloride, hydrogen bromide and hydrogen iodide to form the corresponding elemental halogen and leaching with an aqueous solution to form an aqueous leach solution comprising the halides of divalent manganese and of trivalent iron; 2) treating the leach solution so as to, in either chronological order, a) selectively extract the ferric halide from the aqueous leach solution to form an iron-free raffinate solution; and b) separate solid manganous halide from the aqueous solution; 3) reacting the solid manganous halide with water at elevated temperatures in the range of from about 400° C to about 700° C, to yield manganese oxide and gaseous hydrogen halide; and 4) recycling the hydrogen halide so formed to halidate additional ore.

3,992,508

METHOD OF REMOVING NITROGEN OXIDES FROM A GAS CONTAINING NITROGEN OXIDES

Shigeru Saitoh; Tetsuya Watanabe; Koji Konno, and Tadashi Nakamura, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 21, 1975, Ser. No. 542,778
Claims priority, application Japan, Jan. 21, 1974, 49-9158; May 10, 1974, 49-51934; Dec. 4, 1974, 49-138967
Int. Cl.² C01B *21/00*
U.S. Cl. 423—235 **11 Claims**

1. A method for removing nitrogen oxides from a gas mixture containing same comprising:

contacting the gas mixture with an aqueous scrubbing solution containing at least 0.02% by weight of at least one ferrous salt and at least 0.2% by weight of at least one sulfurous acid alkali salt to absorb said nitrogen oxides in said solution in the form of alkali salts of imidodisulfonic acid;

hydrolyzing said imidodisulfonic acid alkali salts at a pH below 6.5 to obtain a hydrolyzate-containing solution; and

adding a nitrogen compound selected from the group consisting of nitrous acid, nitrous acid anhydride, and nitrate salts to said hydrolyzate-containing solution so as to react with said hydrolyzate to generate nitrogen.

3,992,509
PRODUCTION OF DISULFUR DICHLORIDE

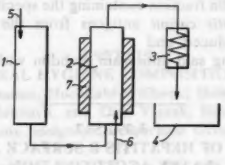
Benno Böhm, and Klaus Velleman, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 18, 1975, Ser. No. 559,472

Claims priority, application Germany, Mar. 30, 1974, 2415601

Int. Cl.² C01B *17/45*

U.S. Cl. 423—469 **1 Claim**



1. A process for the production of disulfur dichloride comprising establishing a molten mass of sulfur at a temperature of about 220° to 260° C and atmospheric pressure, continuously introducing chlorine into said mass at a point from about 50 to 200 cm below the top of the melt, continuously withdrawing disulfur dichloride vapor from above said mass, the sulfur and chlorine being added to said mass at about the rate at which they are withdrawn therefrom in the form of disulfur dichloride and at a rate such that there is always an excess of sulfur in said mass, and condensing said disulfur dichloride vapor.

3,992,510
METHOD FOR RECOVERY OF IODINE

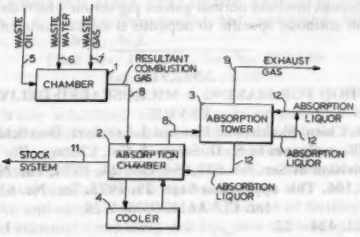
Masahisa Ishigami, Kakogawa; Kunio Arimoto, Takasago; Yoshikazu Inoue, and Ryoichi Fujii, both of Kakogawa, all of Japan, assignors to Harima Chemicals, Inc., Kakogawa, Japan

Filed May 6, 1975, Ser. No. 575,005

Claims priority, application Japan, Sept. 18, 1974, 49-108214

Int. Cl.² C01B *7/14*; C01D *3/12, 5/00*

U.S. Cl. 423—500 **5 Claims**



1. A process of recovering iodine from waste material containing iodine or iodine compound, comprising the steps of burning said waste material in a combustion chamber thereby producing combustion gas containing iodine, passing said combustion gas through a solution containing an agent which reacts with said iodine and thereby produce an iodine compound, and recovering iodine from said iodine compound by acidifying the resulting solution, then chlorinating said resulting solution thereby to precipitate iodine from said resulting solution, characterized in that said solution containing said agent is a solution of a basic aqueous sodium hydroxide solution of sodium thiosulphate, and said produced iodine compound is sodium iodide, and the reaction product consists essentially of said sodium iodide and sodium sulfate and the reaction being according to the equation

$$Na_2S_2O_3 + 4I_2 + 10\ NaOH \rightarrow Na_2SO_4 + 8\ NaI +$$

3,992,511
RECOVERY OF SELENIUM

Kenneth A. Waehner, and Anthony T. Giammarise, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 853,534, Aug. 27, 1969, abandoned. This application Apr. 14, 1972, Ser. No. 244,234

Int. Cl.² C01B *19/00*

U.S. Cl. 423—510 **10 Claims**

1. A process for recovering pure selenium from a selenium-containing coating on a metal substrate without impairment of the substrate for reuse which comprises immersing the coated substrate in an aqueous solution of an alkali metal cyanide co

1 to about 20% by weight of an alkali metal cyanide maintained at a temperature varying from about 25° to about 75° C. for a finite period of about one hour or less, the temperature and time period employed being commensurate with the alkali metal cyanide concentration such that the selenium in said coating is substantially converted to a water-soluble selenocyanate without impairing the substrate for reuse, removing the substrate from the resulting solution, and treating the resulting solution with an acid to precipitate the selenium from said solution.

3,992,512
FINELY PARTICULATED COLLOIDAL PLATINUM COMPOUND AND SOL FOR PRODUCING THE SAME, AND METHOD OF PREPARATION

Henry G. Petrow, Watertown, and Robert J. Allen, Saugus, both of Mass., assignors to Prototech Company, Newton, Mass.

Continuation-in-part of Ser. No. 153,824, June 16, 1971, abandoned, and Ser. No. 430,190, Dec. 28, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 534,732

Int. Cl.² C016 *C01G*; C01G *55/00*

U.S. Cl. 423—512 R **6 Claims**

1. A method of forming a complex platinum sulfite acid containing substantially two moles of sulfite per atom of platinum that comprises adding sodium bisulfite to a substantially neutral solution of sodium chloroplatinate until the pH drops to at least about 4, adding sodium carbonate to bring the pH back to substantially 7 thereby precipitating a complex sodium platinum sulfite salt containing substantially six atoms of sodium and 4 moles of sulfite per atom of platinum, subjecting said precipitate to strong hydrogen-form ion exchange resin to exchange six atoms of sodium with hydrogen and to liberate substantially 2 moles of sulfur dioxide per atom of platinum, and concentrating the solution.

3,992,513

LABELLED PHOSPHOLIPID MATERIAL COLLOIDIALLY DISPERSED AND SIZED TO LOCALIZE AT PRESELECTED ORGANS

Abram Petkau, Pinawa, and Stanley Daniel Pleskach, Beauséjour, both of Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Jan. 7, 1975, Ser. No. 539,134

Int. Cl.² A61K 29/00, 43/00; A61B 10/00; A23J 7/00

U.S. Cl. 424—1 23 Claims

1. A composition for radioactive isotope localization purposes in medical studies which comprises a carrier consisting of phospholipid material colloidally dispersed in an aqueous medium and having a predetermined particle size so as to localize at preselected organs after injection, said carrier being labelled with a short-lived radioisotope in multivalent cationic form.

3,992,514

RADIOIMMUNOASSAY METHOD FOR HUMAN CHORIONIC GONADOTROPIN IN THE PRESENCE OF LUTEINIZING HORMONE

Pietro Donini, Rome, Italy, assignor to Istituto Farmacologico Serono S.p.A., Rome, Italy

Division of Ser. No. 319,782, Dec. 29, 1972, abandoned. This application Oct. 25, 1974, Ser. No. 518,095

Claims priority, application Italy, July 17, 1972, 51583/72

Int. Cl.² G01N 33/00; G01T 1/16; G01N 33/16

U.S. Cl. 424—1.5 8 Claims

1. A method for radioimmunologically discriminating human chorionic gonadotropin from urinary luteinizing hormone in a specimen which comprises mixing the specimen with anti-human chorionic gonadotropin - β serum and radioactively labeled human chorionic gonadotropin - β, and thereafter determining the degree of inhibition of the immunological reaction between the anti-human chorionic gonadotropin-β and the labeled human chorionic gonadotropin-β.

3. A radioimmunological method for quantitatively determining human chorionic gonadotropin in a specimen containing human chorionic gonadotropin in the presence of up to about 10 times the amount in m I.U./ml of luteinizing hormone, which comprises mixing the specimen to be tested with human chorionic gonadotropin-α-absorbed anti-human chorionic gonadotropin-β serum and radioactively labeled human chorionic gonadotropin-β, and thereafter determining the degree of inhibition of the immunological reaction between the human chorionic gonadotropin-α-absorbed anti-human chorionic gonadotropin β serum and the labeled human chorionic gonadotropin β, the observed inhibition being substantially due to human chorionic gonadotropin.

3,992,515

COMPOSITION FOR INDICATING AND METHOD OF REMOVING DENTAL UNDERCUTS AND THE LIKE

Vernon S. Johnson, 3642 Olympia, Houston, Tex. 77019

Filed Nov. 15, 1974, Ser. No. 524,068

Claims priority, application United Kingdom, Dec. 5, 1973, 56310/73

Int. Cl.² G01N 31/22; C09K 3/00

U.S. Cl. 424—7 2 Claims

1. A dental indicator composition, comprising,

a. a tissue tolerant dye in an amount sufficient to display color upon application of the composition to a dental surface,

b. gum copal in an amount effective to cause the dye (a) to adhere to a dental surface, and

c. a solvent in an amount sufficient to solubilize the dye (a) and gum copal (b) wherein the solvent includes by weight proportions from about 10% to about 15% methyl alcohol, from about 10% to about 15% ether and the remainder chloroform.

3,992,516

DIRECT FLUORESCENT ANTIBODY COMPOSITION AND METHOD FOR *PNEUMOCYSTIS CARINII*

Sook Kyung Lim, 813 Granger Ave., Ann Arbor, Mich. 48104

Filed Oct. 30, 1974, Ser. No. 519,217

Int. Cl.² A61K 39/00; G01N 31/22, 33/16

U.S. Cl. 424—8 20 Claims

1. The process of producing pneumocystis carinii antiserum conjugated with fluorescein isothiocyanate comprising

a. digesting out tissue proteins from a homogenized and clarified *pneumocystis carinii* organism suspension containing tissue obtained from an infected host, purifying the obtained suspension by density gradient centrifugation to secure *pneumocystis carinii* organisms which are substantially free of other antigens;

b. immunizing a host with the purified *pneumocystis carinii* organism containing suspension and isolating the antiserum globulin fraction containing the specific antibody for *pneumocystis carinii* antigens from the hyperimmune serum produced; and

c. conjugating said antiserum globulin with a fluorescent dye.

3,992,517

DETECTION OF HEPATITIS B SURFACE ANTIGEN BY LATEX AGGLUTINATION

George E. Lowke, Gales Ferry, and Bela Z. Horvath, Ledyard, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Feb. 19, 1975, Ser. No. 550,949

Int. Cl.² G01N 31/02, 31/06; A61K 39/12, 39/42

U.S. Cl. 424—12 4 Claims

1. In a method of testing for the presence of hepatitis B surface antigen in human blood which comprises mixing a test sample of the said blood free of red blood cells with a purified hepatitis B surface antibody coated latex diagnostic composition and observing a positive reaction, the improvement which comprises differentiating said positive reaction between a specific reaction with hepatitis B surface antigen and a non-specific reaction due to the presence of rheumatoid factor by (a) adsorbing out the rheumatoid factor in said test sample by mixing the sample with latex beads coated with human gamma globulin, (b) mixing the adsorbed test sample with a purified antibody specific to hepatitis B surface antigen to neutralize said antigen, (c) mixing the purified hepatitis B surface antibody coated latex diagnostic composition with the mixture of step (b), and (d) observing specific inhibition of agglutination when said antigen is present.

2. The method of claim 1 wherein the diagnostic composition comprises an aqueous suspension of substantially uniform spherical polystyrene particles having a diameter of about 0.23 microns coated with purified antibody specific to said hepatitis B surface antigen, said antibody being derived from the serum of guinea pigs which have been immunized with purified hepatitis B surface antigen from human blood and said antibody being free from residual antibodies to human serum proteins, said suspension also containing in solution in the aqueous medium normal guinea pig serum which does not contain antibody specific to hepatitis B surface antigen.

3,992,518

METHOD FOR MAKING A MICROSEALED DELIVERY DEVICE

Yie W. Chien, Skokie, and Howard J. Lambert, Deerfield, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 517,454, Oct. 24, 1974, Pat. No. 3,946,106. This application Sept. 29, 1975, Ser. No. 617,542

Int. Cl.² A61K 9/00, 9/26

U.S. Cl. 424—22 1 Claim

1. A method for constructing a biologically acceptable silicone polymer matrix adapted for placement in silicone polymer or ethylene/vinylacetate copolymer tubing having 10–200 micron microsealed compartments distributed throughout, said microsealed compartments containing a pharmaceutical

in a hydrophilic solvent system impermeable to said polymer tubing, comprising:

a. emulsifying the hydrophilic solvent system of water and liquid polyethylene glycol containing the pharmaceutical saturated therein, and stannous octoate cross-linking agent and biologically acceptable room-temperature vulcanizing liquid polydimethylsiloxane silicone polymer and

b. in situ cross-linking the biologically acceptable liquid silicone polymer to form the biologically acceptable silicone polymer matrix with microsealed compartments throughout containing pharmaceutical and hydrophilic solvent system.

3,992,519

ORAL HYGIENE COMPOSITIONS

Eberhard Hofmann, Hochdahl-Willbeck; Heinz Albert Gritz, Benrath-Urdenbach, and Otto Vlazak, Hochdahl-Millrath, all of Germany, assignors to Beecham Group Limited, England

Filed July 24, 1975, Ser. No. 598,853

Claims priority, application United Kingdom, Aug. 1, 1974, 33951/74

Int. Cl.² A61K *7/22*

U.S. Cl. 424—48 **11 Claims**

1. An oral hygiene composition for the prophylaxis and treatment of inflammatory diseases of the periodontium comprising an antibacterial component in an amount of from 0.1 to 5.0%, a vitamin component in an amount of from 0.1 to 5.0% and a surfactant component in an amount of from 0.1 to 5.0%, these percentages being by weight of the total composition, the weight ratio of antibacterial component to surfactant being from 1:5 to 5:1, the antibacterial comprising one or more pharmaceutically acceptable esters of p-hydroxybenzoic acid or one or more pharmaceutically acceptable esters of o-hydroxybenzoic acid or both, and the vitamin component comprising one or more of the following aescin, rutin, panthenol, nicotinamide and vitamin E, no ingredient of the total composition being present in more than a pharmaceutically acceptable amount.

3,992,520

ANTI-FERTILITY VACCINE COMPRISING SOLUBILIZED ZONA PELLUCIDA AND ANTI-SERUM

Ralph B. L. Gwatkin, Maplewood, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 27, 1974, Ser. No. 527,725

Int. Cl.² A61K *39/00*

U.S. Cl. 424—85 **7 Claims**

1. Water solubilized zona pellucida prepared by heating mammalian zona pellucida at a temperature of from about 65° C. to about 100° C. in an aqueous medium comprising buffered saline solution providing a pH of from about 7 to about 7.4 until a clear solution is obtained.

4. An anti-serum composition for control of fertility in the female mammal comprising cell-free sera containing an anti-fertility effective amount of the antibody obtained by injecting into a mammalian host animal the water solubilized zona pellucida of claim 1 of a distinct donor species and thereafter collecting from said host the cell-free sera containing the serum antibodies.

3,992,521

IMMUNOLOGICAL PRODUCT FOR THE TREATMENT OF INTESTINAL INFECTIONS DUE TO PATHOGENIC ENTEROBACTERIA OF THE INFANT

Leon Le Minor, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Nevilly-sur-Seine, France

Filed July 6, 1973, Ser. No. 377,153

Claims priority, application France, July 7, 1972, 72.24696

Int. Cl.² A61K *39/40*

U.S. Cl. 424—87 **21 Claims**

1. A process for obtaining an immunological product containing antibodies effective to control intestinal infections induced in the human infant or young child by enterobacteria pathogenic to same, consisting essentially in preparing suspensions containing the said enterobacteria, immunizing a horse by injecting it subcutaneously with progressively increasing doses of said suspensions admixed with an adjuvant starting with about 2.5 ml of said suspensions, each injection being separated from the following by a rest period during which the horse receives no injection then, after the last subcutaneous injection, effecting on the same horse subcutaneous injections of said suspensions of bacteria but without an adjuvant, and after a long rest period after the last injection bleeding the horse, to obtain the serum which, in the form of drinkable sterile ampuler constitutes the desired active immunological product.

3,992,522

TEMPERATURE-SENSITIVE RECOMBINANT MUTANT VIRUSES AND A PROCESS FOR PRODUCING SAME

Robert M. Chanock, and Brian R. Murphy, both of Bethesda, Md., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Continuation-in-part of Ser. No. 326,554, Jan. 24, 1973, abandoned. This application June 18, 1975, Ser. No. 587,974

Int. Cl.² A61K *39/18*; C12K *7/00*

U.S. Cl. 424—89 **5 Claims**

1. A composition consisting of a virus and a compatible carrier wherein said virus consists of a temperature-sensitive (ts) recombinant mutant virus produced by growth of an influenza A virus in the presence of 5-fluorouracil to produce a chemically mutagenized and temperature-sensitive virus which is the donor of a defined genetic defect and which is mated with a virulent wild-type A virus of a different antigenic type to produce the recombinant mutant virus.

5. A method of producing a temperature-sensitive (ts) recombinant mutant virus which has a shut-off temperature of about 37°–38° C which comprises growing an influenza A virus in the presence of 5-fluorouracil to produce a donor virus possessing a temperature-sensitive genetic defect and mating said donor virus with a virulent wild-type A virus of a different antigenic type to produce a ts recombinant mutant virus of the new antigenic type.

3,992,523

MOLDS AND ANTIMICROBIAL DERIVATIONS THEREFROM PENICILLIUM-TYPE

Norman D. Loud, Clearwater, Fla.; H. Damon Swanson, Concord, N.H., and Robert H. Rines, Boston, Mass., assignors to Allor Foundation, Belmont, Mass.

Continuation of Ser. No. 439,438, Feb. 4, 1974, abandoned. This application June 4, 1975, Ser. No. 583,537

Int. Cl.² C12D *9/06*; A61K *35/70*

U.S. Cl. 424—114 **7 Claims**

1. A method of producing an antibiotic, comprising incubating molds selected from the group consisting of *Penicillium rinesium* and *Penicillium allorensis* on an aqueous nutrient medium until substances having substantial antimicrobial activity are produced, and then recovering said substances from said medium.

3,992,524

ANTITUMOR ANTIBIOTIC MACRACIDMYCIN

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Masa Hamada, Hoya; Masaaki Ishizuka, Tokyo; Akira Takamatsu, Yokohama; Toshikazu Oki, Kamakura, and Hiroshi Tone, Fujisawa, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 555,011

Claims priority, application Japan, Mar. 29, 1974, 49-34626

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—115 9 Claims

1. The process for producing antibiotic macracidmycin which comprises culturing a macracidmycin-producing strain of *Streptomyces atrofaciens* having the identifying characteristics of A.T.C.C. 31104 under submerged aerobic conditions in a nutrient medium containing a carbon source and a nitrogenous nutrient until a substantial amount of macracidmycin is produced by said organism in said nutrient medium.

9. The antibiotic macracidmycin produced by the process of claim 1 which:

a. is effective in inhibiting the growth of ascites forms of Ehrlich carcinoma and Sarcoma 180 in mice, and vaccinia virus in HeLa cells;

b. can be isolated as a white amorphous powder;

c. is soluble in water but substantially insoluble in organic solvents;

d. exhibits an ultraviolet absorption maximum at 280 microns in aqueous solution;

e. exhibits characteristic maxima in the infrared absorption spectrum at 3320, 3075; 2940, 1645, 1540, 1460, 1420, 1230 and 1070 cm^{-1};

f. gives positive Folin-Lowry, ninhydrin, Sakaguchi, and biuret reactions and negative Elson-Morgan and anthrone reactions;

g. has an isoelectric point of pH 6.0;

h. is a weakly acidic polypeptide having a high molecular weight for which a molecular weight of 35,000 to 38,000 is indicated by gel filtration; and

i. gives upon acid hydrolysis the following amino acids (molar ratio): Aspartic acid(8), threonine(7), serine(8), glutamic acid(7), proline(2), glycine(16), alanine(10), valine(4), leucine(4), isoleucine(2), tyrosine(2), phenylalanine(2), histidine(1), lysine(3), arginine(2), ammonia(16) and an unknown amino acid between histidine and lysine on an amino acid analyzer.

3,992,525

ANTIBIOTIC

Elton W. Mann, Portales, N. Mex., assignor to Research Corporation, New York, N.Y.

Division of Ser. No. 367,749, June 4, 1973, which is a division of Ser. No. 121,199, March 4, 1971, Pat. No. 3,819,829, which is a division of Ser. No. 672,462, Oct. 13, 1967, Pat. No. 3,617,448, which is a continuation-in-part of Ser. No. 334,907, Dec. 31, 1963, abandoned. This application Jan. 24, 1975, Ser. No. 543,980

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—115 4 Claims

1. A method for controlling fungal diseases of plants which comprises applying to plants, their seeds or soils containing said plants or seeds an anti-fungal effective amount of the antibiotic substance prepared by the process of cultivating *Bacillus uniflagellatus*, sp.n. (ATCC 15134) in a sterile liquid nutrient medium containing sources of assimilable carbon and nitrogen until a sufficient amount of the antibiotic has been imparted to the medium.

3,992,526

5-ETHOXYMETHYL FURFURYL ESTER OF CHRYSANTHEMUMIC ACID AND ITS USE AS AN INSECTICIDE

Yoshio Katsuda, Osaka, Japan, assignor to Dainippon Jochugiku Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 399,418, Sept. 21, 1973, Pat. No. 3,932,470, which is a division of Ser. No. 112,061, Feb. 2, 1971, Pat. No. 3,796,730, which is a continuation-in-part of Ser. No. 691,173, Dec. 18, 1967, abandoned, and a continuation-in-part of Ser. No. 809,036, March 20, 1969, abandoned, which is a continuation-in-part of Ser. No. 691,173, and Ser. No. 629,422, April 10, 1967, abandoned. This application July 30, 1975, Ser. No. 600,424

Claims priority, application Japan, June 28, 1966, 41-42289; Aug. 24, 1966, 41-55930; Dec. 23, 1966, 41-84365

Int. Cl.[2] A01N *9/28*

U.S. Cl. 424—285 5 Claims

1. 5-ethoxymethylfurfurylester of chrysanthemumic acid.

3,992,527

ANTIBIOTIC SUBSTANCES B-41, THEIR PRODUCTION AND THEIR USE AS INSECTICIDES AND ACARICIDES

Atsushi Aoki; Rikiya Fukuda; Toshio Nakayabu, all of Sapporo; Keijiro Ishibashi, Chiyoko Takeichi, and Mitsuo Ishida, all of Tokyo, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Division of Ser. No. 394,073, Sept. 4, 1973, Pat. No. 3,950,360, which is a continuation-in-part of Ser. No. 365,188, May 30, 1973, abandoned Ser. No. 519,668, Oct. 31, 1974; Ser. No. 569,567, Apr. 21, 1975; Ser. No. 573,567, May 1, 1975; Ser. No. 608,212, Aug. 27, 1975; and Ser. No. 608,895, Aug. 29, 1975, are also divisions of said Ser. No. 394,073

This application Aug. 13, 1975, Ser. No. 604,225

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—122 6 Claims

4. An agricultural insecticidal composition containing an insecticidally effective amount of at least one of the antibiotic substances selected from the group consisting of:

a. a colorless amorphous powder which is difficultly soluble in water and easily soluble in n-hexane, benzene, acetone, ethanol and chloroform and has a molecular formula of $C_{28}H_{54}O_{10}$, a composition of 71.73% carbon and 8.26% hydrogen and the following properties: molecular weights of 672.1 obtained by an osmometric method in acetone and of 672 according to mass spectrum; a specific rotatory power of $[\alpha]_D^{20} = +54°$ obtained with the concentration of a sample of 5 mg./2 ml. and the length of a layer of 10 cm. in acetone; no pKa at a pH ranging from 2 to 12; absorption maximum in the ultraviolet region of the spectrum at 245 mu; characteristic absorption bands in the infrared region shown in FIG. 11; nuclear magnetic resonance spectrum in $(CD_3)_2CO$ shown in FIG. 20; main peaks of the mass spectrum 672, 181, 153 and 151 obtained under the conditions of 75 eV at ionization room temperature of 200° C. and a sample temperature of 120°–190° C.; and the following color reactions according to a thin layer chromatography, yellow to iodine/chloroform, negative to ninhydrin, reddish purple to sulfuric acid and yellow to potassium permanganate; and

b. a colorless substance which is difficultly soluble in water and easily soluble in n-hexane, benzene, acetone, ethanol and chloroform and has a molecular formula of $C_{30}H_{56}O_{10}$, a composition of 68.00% carbon and 8.32% hydrogen and the following properties: a melting point of 176°–178° C.; molecular weights of 629.5 obtained by an osmometric method in acetone and of 686 according to mass spectrum; a specific rotatory power of $[\alpha]_D^{20} = +75°$ obtained with the concentration of a sample of 5 mg./2 ml. and the length of a layer of 10 cm. in acetone; no pKa at a pH ranging from 2 to 12; absorption maximum in the ultraviolet region of the spectrum at 245 mu; characteristic absorption bands in the infrared region shown in FIG.

14; nuclear magnetic resonance spectrum in $(CD_3)_2CO$ shown in FIG. 23; main peaks of the mass spectrum 686, 414, 195, 167, 151 and 125 obtained under the conditions of 75 eV at ionization room temperature of 200° C. and a sample temperature of 120°–190° C.; and the following color reactions according to a thin layer chromatography, yellow to iodine/chloroform, negative to ninhydrin, reddish purple to sulfuric acid and yellow to potassium permanganate; and an agriculturally acceptable carrier.

3,992,528
ANTI-VIRAL SUBSTANCE CONTAINING PEPTIDE, FATTY ACID AND CARBOHYDRATE MOIETIES

Shirl O. Graham, and Sarangamat Gurusiddaiah, both of Pullman, Wash., assignors to Research Corporation, New York, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,745
Int. Cl.² A61K *37/00*; C07C *103/52*
U.S. Cl. 424—177 **7 Claims**

1. An antimicrobial agent containing peptide, fatty acid and carbohydrate moieties, the peptide moiety containing:

d-threonine	l-valine
d-alanine	l-serine
alloisoleucine	l-proline
d-valine	glycine
l-dehydrobutyrin	l-leucine
N-methyl threonine	l-isoleucine

the fatty acid moiety containing an analog of myristic acid unsaturated between carbon atoms 6 and 7, isotrideconoic acid, lauric acid and undecanoic acid; testing as follows in standard tests:

Molisch test — positive
Ninhydrin test — positive
Biuret test — positive
Anthrone test — negative
Carbazole test — weak positive
Tauber's test — negative
Benzidine-glacial HAC — negative
Bial's test — negative
Moore's test — negative

Lieberman-Burchard test -- negative having a molecular weight of about 14,000 being soluble in methyl ethyl ketone and insoluble in water and the infrared curve of FIG. 1, and the pharmaceutically acceptable salts thereof.

3,992,529
METHOD OF TREATING EXCESSIVE FIBRINOLYSIS WITH SYNTHETICALLY MODIFIED TRYPSIN INHIBITORS

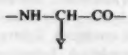
Wolfgang König, Langenhain, Taunus; Oswald Zwisler, Marburg-Marbach, and Gerhard Guthorlein, Cappel, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 503,066, Sept. 4, 1974, Pat. No. 3,953,417. This application Dec. 1, 1975, Ser. No. 636,728
Claims priority, application Germany, Sept. 6, 1973, 2344886
Int. Cl.² A61K *37/00*; C07C *103/52*
U.S. Cl. 424—177 **2 Claims**

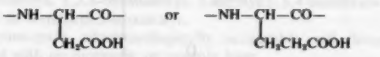
1. A method for treating excessive fibrinolysis caused by disfunctions of proteinases and esterases in a patient suffering therefrom, which method comprises administering to said patient by intravenous injection or infusion an effective amount of a modified trypsin-callicrein inhibitor wherein the five carboxyl groups present in the unmodified material are amidated by peptide groups of the formula

$$-R(R)_xW,$$

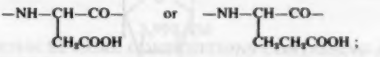
wherein R is



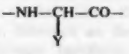
or prolyl; Y is hydrogen, alkyl having 1 to 5 carbon atoms, or alkyl having 1 to 5 carbon atoms substituted by a carboxyl, hydroxyl, or carbonamide group; X is an integer from 0 to 10 such that, if X = 0, then R is



and, if X is an integer from 1 to 10, then at least one R is



and W is —OH, $-NH_2$, $-NHC_2H_5$, $-OCH_3$, or $-OC_2H_5$ when $-R(R)_x-$ contains at least two



wherein Y contains carboxy, but is otherwise —OH, said modified inhibitor being administered in combination with a physiologically tolerated solvent therefor.

3,992,530
[D-2-(1,4-CYCLOHEXADIENYL)GLY]⁶-DES-GLY¹⁰-LRH NONAPEPTIDE AMIDES

Theodore J. Foell, King of Prussia, and Richard W. A. Rees, Bryn Mawr, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,385
Int. Cl.² C07C *103/52*; A61K *37/00*
U.S. Cl. 424—177 **9 Claims**

6. A method for terminating pregnancy in a female mammal which comprises administering a nonapeptide of the formula,

L-pyroglutamyl-L-histidyl-L-tryptophyl-L-seryl-L-tyrosyl-D-2-(1,4-cyclohexadienyl)glycyl-L-leucyl-L-arginyl-L-proline-N(R⁴)(R⁵)

in which R^4 and R^5 are methyl or R^4 is hydrogen and R^5 is alkyl of 1 to 5 carbon atoms or phenethyl, or a non-toxic acid addition salt thereof, to said mammal, post coitally, in a daily regimen containing at least about 600 microgram per kilogram host body weight for a time sufficient to terminate pregnancy.

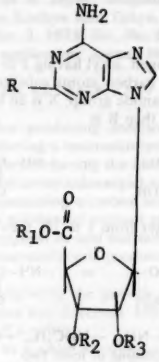
3,992,531
2-SUBSTITUTED ADENOSINE-5'-CARBOXYLATES IN THE TREATMENT OF ANGINAL PAIN

Raj Nandan Prasad, Pierrefonds, Canada; Herman Hal Stein, Skokie, Ill., and Karin Rosemarie Tietje, Philipsburg, Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 428,516, Dec. 26, 1973, Pat. No. 3,903,073. This application Sept. 13, 1974, Ser. No. 505,703
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 **2 Claims**

1. A method of treating anginal pain in a patient in need of such treatment which consists essentially of administering to said patient a dosage of from 0.1 to 10 mg./kg. of body weight

daily of a compound of the formula



wherein R is amino, acetamido or hydroxy, R_1 is loweralkyl, haloloweralkyl, hydroxyloweralkyl, lowercycloalkyl, loweralkenyl, loweralkynyl, loweralkyl(C_3–C_6)cycloalkyl, alkoxyalkyl or hydrogen and R_2 and R_3 each are hydrogen or acyl; and the pharmaceutically acceptable acid addition salts thereof.

3,992,532

FLOWABLE PESTICIDE FORMULATIONS

Mitchell S. Dimitri, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 404,045, Oct. 5, 1973, abandoned, which is a continuation of Ser. No. 181,243, Sept. 16, 1971, abandoned. This application Jan. 2, 1975, Ser. No. 538,002

Int. Cl.² A01N *9/36, 9/30, 9/32, 9/12*

U.S. Cl. 424—213 **1 Claim**

1. A flowable pesticide formulation consisting essentially of the following components having been subjected to high shear mixing;

a. from 40% to 60% by weight of the formulation of a water-insoluble liquid toxicant selected from the group consisting of 1,2,4,5,6,7,8,8 octachloro-2,3,3a,4,7,7a-hexahdyro-4,7-methanoindene; S-(1,2-dicarbethoxyethyl)-O,O-dimethyl dithiophosphate; and 2-chloroallyl diethyl dithiocarbamate,

b. from 1% to 10% by weight of the formulation of a water-insoluble alkali lignin having a particle size less than 1,000 angstroms,

c. from 1% to 25% by weight of the formulation of a member of the group consisting of benzene, toluene, chlorobenzene and straight chain petroleum aliphatic hydrocarbon solvents, and

d. the remainder of the formulation being water.

3,992,533

O-ETHYL-S-n-PROPYL-O-(2-CHLORO-4-BROMO-PHENYL)-THIOPHOSPHATE

Ernest Beriger, and Jozef Drabek, both of Allschwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

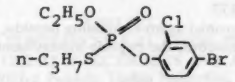
Continuation-in-part of Ser. No. 429,425, Dec. 28, 1973, abandoned, which is a continuation of Ser. No. 295,407, Oct. 5, 1972, abandoned. This application Mar. 14, 1975, Ser. No. 558,589

Claims priority, application Switzerland, Oct. 12, 1971, 14855/71

Int. Cl.² A01N *9/36;* C07F *9/165*

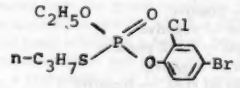
U.S. Cl. 424—225 **4 Claims**

1. A pesticidal composition which comprises as active ingredient the compound of the formula



and a carrier.

2. The compound of the formula



3,992,534

COMPOSITIONS AND METHOD OF TREATING WITH COMPONENT B OF STEREOISOMERIC MIXTURES OF 2'-UNSYMMETRICAL 16,17-METHYLENEDIOXY STERIODS

Ralph Lennart Brattsand, Lund; Bo Thuresson AF Ekenstam, Molndal; Karl Göran Claeson, Saro, and Bror Arne Thalen, Lynd, all of Sweden, assignors to AB Bofors, Bofors, Sweden

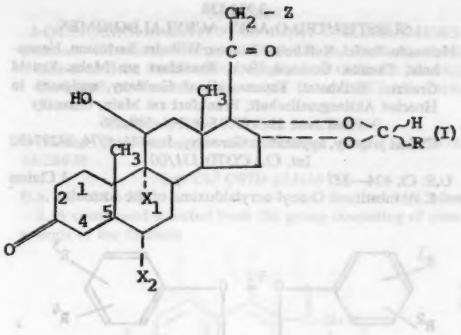
Continuation-in-part of Ser. No. 359,913, May 14, 1973, Pat. No. 3,928,326. This application Nov. 6, 1975, Ser. No. 629,390

Claims priority, application Sweden, May 19, 1972, 6645/72

Int. Cl.² C07J *17/00*

U.S. Cl. 424—241 **47 Claims**

1. A pharmaceutically-active composition, suitable for use in the treatment of inflammation, containing as active ingredient an effective antiinflammatory amount of a steroid compound, in combination with a pharmaceutically-acceptable carrier, said steroid compound being the stereoisomeric component B of a stereoisomeric mixture (isomeric pair) of a steroid having the general formula:



wherein the 1,2-position is saturated or a double bond is present in that position, a double bond always being present in at least the 4,5-position, X_1 and X_2 are independently selected from hydrogen and fluorine, X_1 being selected from hydrogen and fluorine when X_2 is hydrogen and X_1 being fluorine when X_2 is fluorine, Z is selected from hydroxyl and esterified hydroxyl wherein the hydroxyl group is esterified with a member of the group consisting of phosphoric and sulphuric acids, dicarboxylic acids having two to twelve carbon atoms, inclusive, pyridine-3-carboxylic acid, pyridine-4-carboxylic acid, benzofurane-2-carboxylic acid, menthoxymethylcarboxylic acid, and lower alkanoic acids, and R is selected from alkyl groups with straight or branched hydrocarbon chains having one to ten carbon atoms, inclusive, said component B being the isomer of the isomer pair showing the greatest relative rotary power or having the greatest retention volume in gel filtration using a cross-linked dextran gel.

3,992,535

4-HYDROXY-2H-NAPHTHO[2,1-E]-1,2-THIAZINE-3-CARBOXAMIDE-1,1-DIOXIDES AND SALTS THEREOF

Günter Trummlitz; Helmut Teufel; Wolfhard Engel; Ernst Seeger; Walter Haarmann, and Günter Engelhardt, all of Biberach, Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

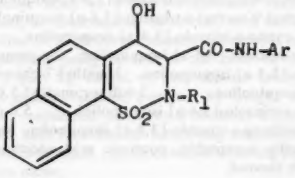
Filed Oct. 29, 1975, Ser. No. 626,623

Claims priority, application Germany, Nov. 8, 1974, 2452996; Sept. 3, 1975, 2539112

Int. Cl.² A61K *31/54;* **C07D** *279/02*

U.S. Cl. 424—246 **9 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, methyl or ethyl, and

Ar is phenyl, 3-chlorophenyl, 3-bromophenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 3-tolyl, 2-methoxhphenyl, 3-methoxyphenyl, 2-pyridyl, 4-methyl-2-pyridyl, 6-methyl-2-pyridyl, 3-hydroxy-2-pyridyl, 3-pyridyl, 4-pyridyl, 6-chloro-3-pyridazinyl, 2-pyrazinyl, 6-chloro-2-pyrazinyl, 6-chloro-4-pyrimidinyl, 2-thiazolyl, 4-methyl-2-thiazolyl, 4-ethyl-2-thiazolyl, 5-methyl-2-thiazolyl, 5-ethyl-2-thiazolyl, 4,5-dimethyl-2-thiazolyl, 4-ethyl-5-methyl-2-thiazolyl, 5-ethyl-4-methyl-2-thiazolyl, 2-benzothiazolyl, 4,5,6,7-tetrahydro-2-benzothiazolyl, 5,6-dihydro-7H-thiopyrano[4,3-d]thiazol-2-yl, 3-methyl-5-isothiazolyl, 1,3,4-thiadiazolyl, 5-methyl-1,3,4-thiadiazol-2-yl or 5-methyl-3-isoxazolyl,

or a non-toxic, pharmacologically acceptable salt thereof formed with an inorganic or organic base.

3,992,536

PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-PHENYL-2,2,4,4-C_1-C_2 ALKYL-3-[4-PHENYL (OR PYRIDYL)-PIPERAZINO]-CYCLOBUTANOL-(1) AND METHOD OF USE

Manfred Kleemann, Tamm; Joachim Kühling, Biberach an der Riss; Gerhart Griss, Biberach an der Riss, and Rudolf Hurnaus, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

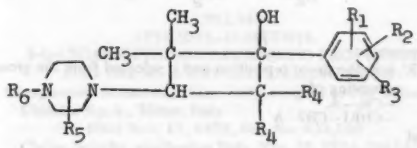
Division of Ser. No. 413,233, Nov. 6, 1973, Pat. No. 3,931,185. This application Dec. 16, 1975, Ser. No. 641,337

Claims priority, application Germany, Nov. 11, 1972, 2255439; Oct. 3, 1973, 2349639

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **22 Claims**

1. A sedative or muscle-relaxing pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective sedative or muscle-relaxing amount of a compound of the formula



wherein

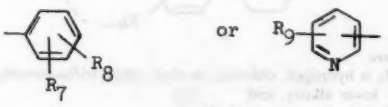
R_1 is hydrogen, fluorine, chlorine bromine, hydroxyl, trifluoromethyl, benzyloyx, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 3 carbon atoms, benzyloxy, acetoxy, benzoyloxy, isobutyryloxy, phenyl or cyclohexyl,

R_2 and R_3 are each hydrogen, methyl or methoxy, or any two of R_1, R_2 and R_3 taken together are methylenedioxy,

R_4 is hydrogen or alkyl of 1 to 2 carbon atoms,

R_5 is hydrogen or methyl, and

R_6 is



where

R_7 and R_8 are each hydrogen, fluorine, chlorine, bromine, trifluoromethyl, hydroxyl, nitro, benzyloxy, alkyl of 1 to 2 carbon atoms, alkoxy of 1 to 3 carbon atoms, methylthio, acetoxy, benzoyloxy or isobutyryloxy, and

R_9 is hydrogen, chlorine, bromine, hydroxyl, nitro, amino, benzyloxy, carboxy, carbomethoxy, carbethoxy, methyl, methoxy or acetoxy, provided however, that only one of R_1, R_7, R_8 and R_9 is acetoxy, benzoyloxy of isobutyryloxy; a physiologically compatible acid addition salt thereof; or, when R_9 is carboxy, a physiologically compatible salt thereof formed with an inorganic or organic base.

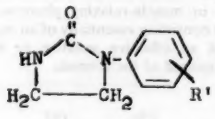
3,992,537

PHARMACEUTICAL COMPOSITIONS CONTAINING AN N-PHENYL-IMIDAZOLIDINE-2-ONE AND METHOD OF USE

Anton Mentrup; Ernst-Otto Renth; Kurt Schromm, all of Ingelheim am Rhein, and Peter Danneberg, Ockenheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Division of Ser. No. 440,823, Feb. 8, 1974, Pat. No. 3,937,708, which is a continuation of Ser. No. 259,532, June 5, 1972, abandoned. This application Dec. 1, 1975, Ser. No. 636,738
Claims priority, application Austria, June 7, 1971, 4920/71
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 **10 Claims**

1. A CNS-depressing pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective CNS-depressing amount of a compound of the formula



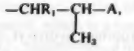
wherein

R' is in the m- or p-position and is selected from the group consisting of

$-CH_2-A$,

$-CHR_1-CH_2-A$

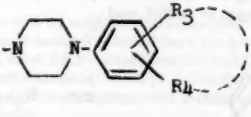
and



where

R_1 is hydrogen or hydroxyl, and

A is



where

R_3 is hydrogen, chlorine, methyl, ethyl, trifluoromethyl or lower alkoxy, and

R_4 is hydrogen or methyl, or

R_3 and R_4, together with each other and neighboring carbon atoms of the phenyl ring to which they are attached, are naphthyl,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

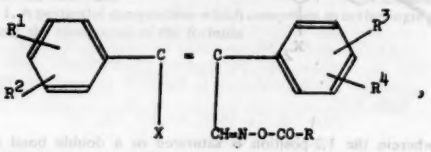
3,992,538

SUBSTITUTED O-ACYL-ACRYLALDOXIMES

Hermann Teufel, Kelkheim, Taunus; Wilhelm Bartmann, Neuenhain, Taunus; Gerhard Beck, Frankfurt am Main; Ernold Granzer, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 19, 1975, Ser. No. 588,186
Claims priority, application Germany, June 21, 1974, 24297492
Int. Cl.² C07D *131/00*
U.S. Cl. 424—327 **3 Claims**

1. A substituted O-acyl-acrylaldoxime of the formula



wherein X is chlorine or bromine; R is alkyl, alkoxy, alkylamino, alkenyl, alkenoxy, or alkenylamino each having 1 to 12 carbon atoms, or is aryl, aryloxy, arylalkyl, arylalkoxy, arylamino, or arylalkylamino, or is aryl, aryloxy, arylalkyl, arylalkoxy, arylamino, or arylalkylamino mono- or di-substituted by alkyl having 1 to 6 carbon atoms; and R^1, R^2, R^3, and R^4, which may be the same or different, are hydrogen, halogen, or alkyl or alkoxy having 1 to 6 carbon atoms.

3,992,539

S-TRIAZOLO-[3,4-A]ISOQUINOLINES IN TREATING INFLAMMATORY DISORDERS

Fernand G. F. Eloy, Rhode St. Genese, Belgium, and Robert W. Shanahan, Allendale, N.J., assignors to Mallinckrodt, Chemical Works, St. Louis, Mo.

Division of Ser. No. 164,880, July 26, 1971, abandoned. This application Dec. 12, 1973, Ser. No. 426,639
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² A61K *31/47, 31/495, 31/535*
U.S. Cl. 424—258 **5 Claims**

1. A method of treating an inflammatory disorder in a mammal which comprises administering to said mammal an effective amount of a compound selected from the group consisting of 3-(N,N-diethylaminoethylamino)-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-6-carbomethoxy-s-triazolo-[3,4-a]-isoquinoline, 3-isobutyl-s-triazolo-[3,4-a]-isoquinoline, 8,9-methylenedioxy-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-6-methyl-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-8,9-methylenedioxy-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-9-methoxy-s-triazolo-[3,4-a]-isoquinoline, 3-methyl-9-methoxy-s-triazolo-[3,4-a]-isoquinoline, 3-methyl-8-methoxy-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-9-chloro-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-8-methoxy-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-6-carboxy-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-9-methyl-s-triazolo-[3,4-a]-isoquinoline, 3-methyl-7-cyano-s-triazolo-[3,4-a]-isoquinoline, 3-acetoxymethyl-s-triazolo-[3,4-a]-isoquinoline, 3-n-propyl-7-bromo-s-triazolo-[3,4-a]-isoquinoline, 3-methyl-7-chloro-s-triazolo-[3,4-a]-isoquinoline, 3-trifluoromethyl-5,6-dihydro-9-methoxy-s-triazolo-[3,4-a]-isoquinoline, 5,6-dihydro-8,9-methylenedioxy-s-triazolo-[3,4-a]-isoquinoline and the pharmaceutically acceptable, nontoxic acid addition and alkali metal salt thereof.

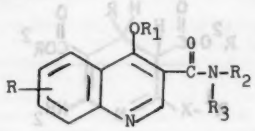
3,992,540

3-QUINOLINE-SUBSTITUTED 4-OXY-CARBOXAMIDES

Francois Clémence, Rosny-sous-Bois; Roger Deraedt, Pavillons-sous-Bois; André Allais, Gagny, and Odile Le Martret, Paris, all of France, assignors to Roussel-UCLAF, Paris, France

Filed July 28, 1975, Ser. No. 599,369
Claims priority, application France, Aug. 13, 1974, 74.28038
Int. Cl.² C07D *215/56*
U.S. Cl. 424—258 16 Claims

1. A compound selected from the group consisting of compounds of the formula



wherein R is selected from the group consisting of halogen, $-CF_3$, $-OCF_3$and $-SCF_3$ in the 7- or 8-position, R_1 is selected from the group consisting of hydrogen and acyl of an aliphatic carboxylic acid of 2 to 4 carbon atoms, R_3 is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms and R_2 is selected from the group consisting of thiazolyl, pyridinyl and oxazolyl and their non-toxic, pharmaceutically acceptable acid addition salts.

12. An analgesic composition comprising an analgesically effective amount of a compound of claim 1 and an inert pharmaceutical carrier.

3,992,541

ANALGESIC FORMULATIONS HAVING ENHANCED THERAPEUTIC ACTIVITY

Martin Katz, Los Altos Hills, Calif., assignor to Syntex Corporation, Panama, Panama

Continuation-in-part of Ser. No. 442,004, Feb. 13, 1974, Pat. No. 3,936,528. This application Aug. 4, 1975, Ser. No. 601,909
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.² A61K *31/19, 31/485*
U.S. Cl. 424—260 15 Claims

1. An analgesic formulation comprising, as a first component, about 50 to about 750 mg. of d 2-(6-methoxy-2-naphthyl)propionic acid, or a pharmaceutically acceptable salt thereof, and, in combination therewith, as a second component, codeine or a pharmaceutically acceptable salt thereof; said components being present in the ratio of 0.16 part to about 0.32 part by weight of said second component, expressed as codeine sulfate, per part by weight of said first component, expressed as d 2-(6-methoxy-2-naphthyl)propionic acid; said formulation exhibiting enhanced analgesic activity over that which can be obtained utilizing either of said components alone.

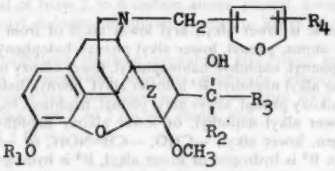
3,992,542

PHARMACEUTICAL COMPOSITIONS CONTAINING AN N-(FURYL-METHYL)-6,14-(ENDOETHANO OR ENDOETHENO)-7α-HYDROXYALKYL-TETRAHYDRO-NOROIPA-VINE OR -NORTHEBAINE AND METHOD OF USE

Adolf Langbein; Herbert Merz; Gerhard Walther, and Klaus Stockhaus, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein Germany

Division of Ser. No. 369,500, June 13, 1973, Pat. No. 3,931,189. This application Oct. 30, 1975, Ser. No. 627,208
Claims priority, application Germany, June 21, 1972, 2230154
Int. Cl.² A61K *31/485*
U.S. Cl. 424—260 12 Claims

1. An analgesic or antitussive pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective analgesic or antitussive amount of a compound of the formula



wherein

R_1 is hydrogen, methyl or acetyl,
R_2 is hydrogen or methyl,
R_3 is hydrogen, methyl, n-propyl, phenethyl or phenyl
R_4 is hydrogen or methyl, and
Z is —CH=CH— or $-CH_2-CH_2-$,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

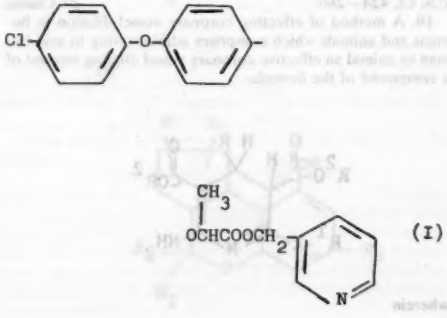
3,992,543

(PYRIDYL-3)-METHYL 2-(p-CHLOROPHENOXY-PHENOXY) PROPIONATE AND USE AS A HYPOLIPEMISING DRUG

Giangiacomo Massaroli, Milan, Italy, assignor to Poli Industria Chimica S.p.A., Milan, Italy

Filed Nov. 11, 1975, Ser. No. 631,180
Claims priority, application Italy, Nov. 20, 1974, 29614/74
Int. Cl.² A61K *31/395;* C07D *213/55*
U.S. Cl. 424—263 5 Claims

1. (Pyridyl-3)-methyl 2-(p-chlorophenoxy-phenoxy)-propionate of the formula (I)



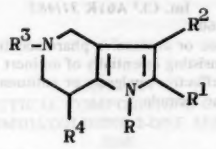
(I)

3,992,544
TETRAHYDRO-PYRROLO[3,2-C]PYRIDINE DERIVATIVES

John Leheup Archibald, Windsor, and Kenneth Heatherington, Burnham, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

Filed Apr. 15, 1975, Ser. No. 568,355
Claims priority, application United Kingdom, Apr. 24, 1974, 17812/74
Int. Cl.² C07D 471/04
U.S. Cl. 424—263 10 Claims

1. A compound of the formula:



wherein R is lower alkyl, aryl lower alkyl of from 7 to 12 carbon atoms, phenyl, lower alkyl phenyl, halophenyl, lower alkoxyphenyl, naphthyl, halonaphthyl, lower alkoxy naphthyl, or lower alkyl naphthyl; R^1 is lower alkyl, phenyl, halophenyl, lower alkoxy phenyl, lower alkyl phenyl, naphthyl, halonaphthyl, lower alkyl naphthyl, or lower alkoxy naphthyl; R^2 is hydrogen, lower alkyl, —CHO, —CH=NOH, or $-CH_2OR^5$ wherein R^5 is hydrogen or lower alkyl; R^3 is hydrogen lower alkyl, benzoyl, aryl lower alkyl of from 7 to 12 carbon atoms or aryl lower alkyl of from 7 to 12 carbon atoms wherein the aryl portion is substituted by halogen, lower alkyl or lower alkoxy; R^4 is hydrogen or lower alkyl; or the pharmaceutically acceptable acid addition or quaternary ammonium salts thereof.

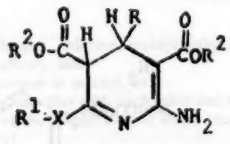
9. A pharmaceutical composition suitable for administration to an animal suffering from hypertension comprising an anti-hypertensive amount of a compound of claim 1, and a pharmacologically acceptable carrier.

3,992,545
2-AMINO-4,5-DIHYDROPYRIDINE DERIVATIVES IN PHARMACEUTICAL COMPOSITIONS

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Eberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 453,930, March 22, 1974, which is a division of Ser. No. 336,481, Feb. 28, 1973, Pat. No. 3,876,646. This application Dec. 12, 1974, Ser. No. 531,919
Claims priority, application Germany, Mar. 6, 1972, 2210650; Dec. 13, 1972, 2260860
Int. Cl.² A61K 31/455
U.S. Cl. 424—266 27 Claims

10. A method of effecting coronary vessel dilation in humans and animals which comprises administering to said human or animal an effective coronary vessel dilating amount of a compound of the formula:



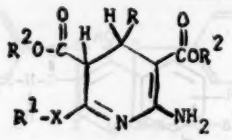
wherein

R is pyridyl unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno;

each of R^1 and R^2, taken independently of the other, is lower alkyl, alkenyl of 2 to 4 carbon atoms or alkynyl of 2 to 4 carbon atoms; and

X is oxygen or sulfur.

19. A method of treating hypertension in humans and animals which comprises administering to such human or animal an effective antihypertensive amount of a compound of the formula:



wherein

R is pyridyl unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno;

each of R^1 and r^2, taken independently of the other is lower alkyl, lower alkenyl or lower alkynyl; and

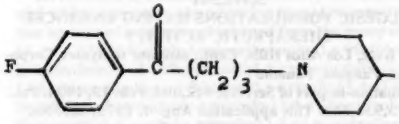
X is oxygen or sulfur.

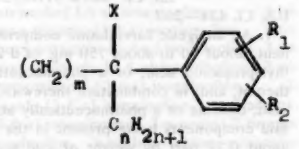
3,992,546
4-PIPERIDINOBUTYROPHENONES AS NEUROLEPTICS

Charles Ferdinand Huebner, Chatham, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,737
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² A61K 31/445
U.S. Cl. 424—267 3 Claims

1. A pharmaceutical composition comprising a neuroleptically effective amount of a compound of the formula





wherein X is hydroxy; *m* is 0, *n* is 1 or 2; and each of R_1 and R_2 is hydrogen, methyl, ethyl, methoxy, ethoxy, fluorine, chlorine, bromine or trifluoromethyl, or a therapeutically acceptable acid addition salt thereof, together with a pharmaceutical excipient.

3,992,547

4-(5H-DIBENZO[a,d]CYCLOHEPTEN-5-YLIDENE)-1-METHYLPIPERIDINE-N-OXIDE ISOMER

Marcia E. Christy, Perkasie, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 20, 1974, Ser. No. 525,324
Int. Cl.² C07D *211/70*
U.S. Cl. 424—267 **3 Claims**

1. β-4-(5H-Dibenzo[a,d]cyclohepten-5-ylidene)-1-methylpiperidine-N-oxide substantially free of its corresponding α-geometrical isomer or a nontoxic pharmaceutically acceptable salt thereof.

3,992,548

FUNGICIDAL COMPOSITION

Ernst Heinrich Pommer; Juergen Kradel, both of Limburgerhof, and Rudolf Polster, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed May 31, 1974, Ser. No. 474,899
Claims priority, application Germany, June 7, 1973, 2329034
Int. Cl.² A01N *9/22*; A61K *31/40*
U.S. Cl. 424—274 **5 Claims**

1. A fungicidal composition comprising

a. diisopropyl 3-nitroisophthalate and

b. a dithiocarbamate selected from the group consisting of manganese ethylenebisdithiocarbamate;
manganese zinc ethylenebisdithiocarbamate;
zinc ethylenebisdithiocarbamate;
zinc-(N,N′-propylenebisdithiocarbamate);
ammonia complex of zinc-(N,N′-ethylenebisdithiocarbamate) and N,N′-polyethylenebis-(thiocarbamoyl)-disulfide;
ammonia complex of zinc-(N,N′-propylenebisdithiocarbamate) and N,N′-polypropylenebis-(thiocarbamoyl)-disulfide; and tetramethylthiuram disulfide, and/or

c. a compound selected from the group consisting of N-thiotrichloromethyl tetrahydrophthalimide and N-thiotrichloromethyl phthalimide,

the weight ratio of a to b and/or c being from about 1:1 to 1:4.

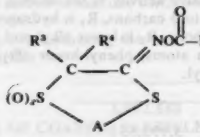
3,992,549

PESTICIDAL COMPOSITIONS AND METHODS OF KILLING PESTS USING N-POLYHALO-ALKANESULFENYL CARBAMOYLOXIMINO DI-SULFUR CONTAINING HETEROCYCLIC COMPOUNDS

John A. Durden, Jr., and Themistocles D. J. D'Silva, both of South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 25, 1973, Ser. No. 364,138
Int. Cl.² A01N *9/00, 9/14*
U.S. Cl. 424—277 **20 Claims**

1. An insecticide and miticide composition comprising an extender and as an active toxicant an insecticidally or miticidally effective amount of a compound of the formula:



wherein:

R^1 is lower alkyl having from 1 to 4 carbon atoms, phenyl, or phenyl substituted with one or more halogen, acylamido, methylthio, methoxy, or alkyl substituents having from 1 to 4 carbon atoms or a methylenedioxy group attached to adjacent carbon atoms of said phenyl;

R^2 is trihalomethanesulfenyl;

R^3 and R^4 may be the same or different and are hydrogen, lower alkyl having from 1 to 6 carbon atoms, lower alkenyl having from 2 to 6 carbon atoms, halogen substituted alkyl having from 1 to 6 carbon atoms, alkoxyalkyl, alkylthioalkyl, alkylsulfinylalkyl, or alkylsulfonylalkyl having a total of from 2 to 6 carbon atoms, phenyl, lower alkylphenyl, halogen substituted phenyl, or lower alkoxyphenyl;

A is methylene, ethylene, propylene, ethenylene, propenylene or methylene, ethylene, propylene, ethenylene or propenylene substituted with one or more alkyl groups having from 1 to 3 carbon atoms; and

x is 0, 1 or 2.

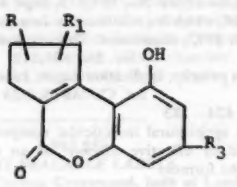
3,992,550

PHARMACEUTICAL COMPOSITIONS CONTAINING ALRYL SUBSTITUTED CYCLOPENTA BENZOPYRANS

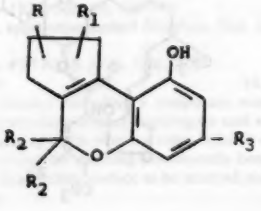
Martin Winn, Deerfield, Ill.; Raj Kumar Razdan, Belmont; Haldean Cloyce Dalzell, Weston, both of Mass., and Joyce Ruth Krei, Glenview, Ill., assignors to Sharps Associates, Cambridge, Mass.

Division of Ser. No. 392,635, Aug. 29, 1973, Pat. No. 3,929,835. This application July 9, 1975, Ser. No. 594,533
Int. Cl.² A61K *31/335*
U.S. Cl. 424—279 **13 Claims**

13. The method of inducing an antidepressive activity in an animal which comprises administering to the animal a safe but effective amount of a compound of the formulae



or



to induce an antidepressive activity in the animal, wherein R is lower alkyl having 1 to 5 carbons, R_1 is hydrogen or lower alkyl having 1 to 5 carbons, R_2 is lower alkyl and R_3 is alkyl having 1 to 20 carbon atoms, phenyl-lower alkyl or C_3 to C_8-cycloalkyl-lower alkyl.

3,992,551

ANTISIOTIC SUBSTANCES B-41, THEIR PRODUCTION AND THEIR USE AS INSECTICIDES ACARICIDES

Atsushi Aoki; Rikiya Fukuda; Toshio Nakayabu, all of Sapporo; Keijiro Ishibashi, Hiro; Chiyoko Takeichi, Hiro, and Mitsuo Ishida, Hiro, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

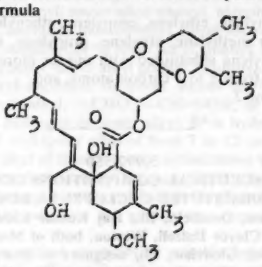
Division of Ser. No. 394,073, Sept. 4, 1973, Pat. No. 3,950,360, which is a continuation-in-part of Ser. No. 365,188, May 30, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 608,895

Claims priority, application Japan, June 8, 1972, 47-57058

Int. Cl.² A01N *9/28*

U.S. Cl. 424—283 **2 Claims**

2. An agricultural insecticidal composition containing an insecticidally effective amount of the compound having the structural formula



and an agriculturally-acceptable carrier.

3,992,552

ANTIBIOTIC SUBSTANCE B-41, THEIR PRODUCTION AND THEIR USE AS INSECTICIDES AND ACARICIDES

Atsushi Aoki; Rikiya Fukuda; Toshio Nakayabu, all of Hokkaido; Keijiro Ishibashi, Tokyo; Chiyoko Takeichi, Tokyo, and Mitsuo Ishida, Tokyo, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

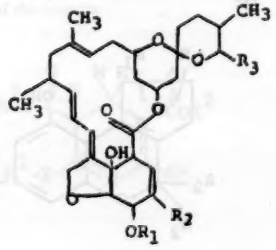
Division of Ser. No. 394,073, Sept. 4, 1973, Pat. No. 3,950,360, which is a continuation-in-part of Ser. No. 365,188, May 30, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,212

Claims priority, application Japan, June 8, 1972, 47-57058

Int. Cl.² A01N *9/28*

U.S. Cl. 424—283 **10 Claims**

6. An agricultural insecticidal composition containing an insecticidally effective amount of an antibiotic substance having the formula



wherein R_1 represents a hydrogen atom or methyl, R_2 represents methyl, and R_3 represents methyl or ethyl, and an agriculturally acceptable carrier.

3,992,553

BENZOYLUREIDO-DIPHENYL ETHER INSECTICIDES

Wilhelm Sirrenberg, Sprockhoevel, Westphalia; Ingeborg Hammann, Cologne; Wilhelm Stendel, Wuppertal, and Jürgen Schramm, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

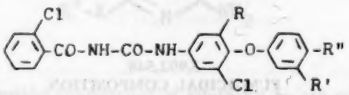
Filed July 24, 1975, Ser. No. 598,602

Claims priority, application Germany, Aug. 13, 1974, 2438747

Int. Cl.² A01N *9/20*; **C07C** *121/78, 121/19*

U.S. Cl. 424—304 **8 Claims**

1. A benzoylureidodiphenyl ether of the formula



in which

one of R and R' is hydrogen and the other is chlorine, and

R'' is nitro or cyano.

6. An insecticidal composition containing as active ingredient an insecticidally effective amount of a compound according to claim 1 in admixture with a diluent.

3,992,554

PROCESS FOR PRODUCING LOW CALORIE PASTA

Jon R. Blake, and Harold E. Miller, both of Minneapolis, Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed July 21, 1975, Ser. No. 597,847

Int. Cl.² A23L *1/16*

U.S. Cl. 426—557 **10 Claims**

1. A method for preparing a low calorie pasta comprising mixing cereal material, vegetable protein, and oil seed endosperm cell wall residue, the combination of cereal material and vegetable protein being present in an amount of from about 40 to 80 percent, dry weight basis; the oil seed endosperm cell wall residue being present in an amount of from about 2 to 60 percent, dry weight basis, said cell wall residue being the non-starchy polysaccharide portion of the oil seed endosperm comprising a mixture of cellulose, hemicellulose, oil seed plant gum and pectic substances; adjusting the moisture content of said mixture to between about 12 to 45 percent by weight, working the mixture sufficient to coalesce said protein and bind said hydrated mixture together and shaping said mixture to form a pasta product.

3,992,555

SUPPLEMENTED FOOD PRODUCT AND PROCESS FOR PREPARING SAME

Louis E. Kovacs, Chicago, Ill., assignor to Vitamins, Inc., Chicago, Ill.

Division of Ser. No. 358,019, May 7, 1973, abandoned, which is a continuation-in-part of Ser. No. 40,384, May 15, 1970, abandoned. This application Mar. 28, 1975, Ser. No. 562,874

Int. Cl.² A23L *1/30*

U.S. Cl. 426—72 **9 Claims**

1. A food product comprising a base food product having affixed to at least a portion of the surface of said product a food supplement, said food supplement comprising a mixture of a plurality of different food supplements,

each said supplement comprising finely divided particles of an edible metabolizable fat carrier having a melting point between about 100° and 250° F., said fat carrier having admixed therein a nutrient selected from the group con-

sisting of assimilable iron compounds, a vitamin, a mineral, or compatible mixtures thereof.

3,992,556

SUPPLEMENTED FOOD PRODUCT

Louis E. Kovacs, Chicago, Ill., and Richard Merriam Vondell, Battle Creek, Mich., assignors to Vitamins, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 358,019, May 7, 1973, abandoned, which is a continuation-in-part of Ser. No. 40,384, May 15, 1970, abandoned. This application June 30, 1975, Ser. No. 591,707

Int. Cl.² A23L *1/30*

U.S. Cl. 426—72 15 Claims

1. A process for producing a base food product with a food supplement on at least a portion of the surface thereof,

said food supplement comprising finely divided particles of an edible, metabolizable fat carrier having a melting point between about 100° and 250° F., said fat carrier having admixed therein a nutrient selected from the group consisting of an assimilable iron compound, vitamins, minerals, and mixtures thereof;

said process comprising:

Processing a base food product at a temperature above said melting point of said fat carrier;

applying said food supplement to at least a portion of the surface of said face food product while said surface is at a temperature above said melting point;

maintaining said food supplement in contact with said base food product for a time sufficient to permit at least a portion of said food supplement fat carrier to melt and adhere to the surface of said base food product; and,

cooling said food product to a temperature below the melting point of said fat.

3,992,557

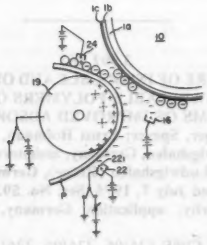
IMAGE TRANSFER METHOD

Shunichi Kubo, Tokyo; Takao Aoki, Abiko; Eiichi Kondo, Kawasaki, and Shunzo Inoue, Fussa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed July 17, 1974, Ser. No. 489,087

Int. Cl.² G03G *13/00*

U.S. Cl. 427—24 6 Claims



1. An image transfer method for transferring a toner image from a surface of a toner image carrier onto a transfer medium, comprising the steps of:

forming a toner image on said toner image carrier;

imparting a uniform charge of predetermined polarity to the surface of said toner image carrier carrying said toner image;

imparting a first uniform charge of the same said polarity to one surface of said transfer medium;

contacting said one surface of said transfer medium to said surface of the toner image carrier after imparting said charge to said transfer medium, and simultaneously maintaining the opposed surface of said transfer medium at a predetermined voltage during said contact, thereby transferring the toner image from said surface of said toner image carrier to said one surface of said transfer medium; and

subsequently separating the transfer medium from the image carrier.

3,992,558

PROCESS OF COATING PARTICLES OF LESS THAN 20 MICRONS WITH A POLYMER COATING

Robert Smith-Johannsen, Portola Valley, and Wendell W. Moyer, Jr., Atherton, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed May 10, 1974, Ser. No. 468,668

Int. Cl.² B05D *7/00*

U.S. Cl. 427—213 13 Claims

1. A process for coating discrete particles of less than 20 microns with a high polymer coating comprising:

injecting the polymer and particles into a chamber;

injecting a fluid stream into the chamber under pressure and at an elevated temperature, said fluid propelling the polymer and particles at high velocities along an arcuate path having both a recycle and separation outlet, wherein said polymer and said particles undergo repeated high velocity impacts with each other thereby coating said particles with said polymer and wherein discrete particles of less than approximately 20 microns having the polymer coating thereon are separated out of the chamber, but agglomerated particles of greater than 20 microns are recycled around the arcuate path.

3,992,559

HEAT SEALABLE LABELS

Ian Day, and John Carlton Greenwood, both of London, England, assignors to Polymark Limited, England

Continuation of Ser. No. 143,591, May 14, 1971, abandoned, which is a continuation-in-part of Ser. No. 795,528, Jan. 31, 1969, abandoned, which is a continuation-in-part of Ser. No. 702,522, Feb. 2, 1968, abandoned. This application Aug. 31, 1973, Ser. No. 393,486

Claims priority, application United Kingdom, Feb. 2, 1968, 5539/68

Int. Cl.² B32B *3/00, 7/06, 7/10*

U.S. Cl. 428—200 14 Claims

1. A marking element including a temporary removable support and an information bearing marking on said support, said marking comprising a film-forming cross-linkable copolyamide resin system capable of being permanently bonded by heat and pressure to a flexible surface to be marked, said resin system comprising

i. a copolymide obtained by copolymerization of at least one diamine, at least one aliphatic diacid, which may be combined in the form of a salt, and at least one further different compound selected from the group consisting of lactams, diamines and aliphatic diacids, said copolyamide being soluble in a solution of C_1-C_5 aliphatic alcohol and water and having a molecular weight of from 5,000 to 30,000 as determined by end group analysis;

ii. 5 to 30% by weight of a cross-linking agent, for said copolyamide, having blocked cross-linking groups of the general formula $-NCH_2OR$ wherein R is a lower alkyl radical, and

iii. 0.1 to 7% by weight of a curing agent capable of providing acid radicals characterized by acidic properties corresponding to a free acid having a pK value greater than 2, said resin system being curable under the action of heat and pressure to form an insoluble wear resistant marking on said surface.

3,992,560

PROCESS FOR FLAMEPROOFING ORGANIC FIBRE MATERIAL BY THE TRANSFER PROCESS

Fritz Mayer, Haltingen, Germany; Jörg Kern, Oberwil, and Hermann Nachbur, Dornach, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed June 18, 1974, Ser. No. 480,337

Claims priority, application Switzerland, June 22, 1973, 9187/73; July 26, 1973, 10928/73

Int. Cl.² C23C *11/00*; C09K *3/28*

U.S. Cl. 428—921 **12 Claims**

1. Process for flameproofing organic fiber material by the dry thermal process which comprises applying to an inert carrier a preparation containing a halogen compound of the formula

$$R_0 - X - A_0$$

wherein R_0 is halogenoalkyl with 1 to 4 carbon atoms, X is —CO—NY—, —COO—, —OCO— or —O—, Y is hydrogen or hydroxyalkyl with 1 to 4 carbon atoms, A_0 is halogenoalkyl or hydroxyalkyl with 1 to 4 carbon atoms, $—NH_2$, alkylene-COOH with 3 or 4 carbon atoms or -alkylene-O-halogenoalkyl with 1 to 4 carbon atoms in the alkylene radical and 1 to 4 carbon atoms in the halogenoalkyl radical, and wherein, if X is —CO—NY— and Y is hydrogen, A_0 can also be hydrogen, and if X is —O—, R_0 and A_0 can also be halogenoalkyl or halogenoalkenyl with 3 to 6 carbon atoms, then bringing the carrier into contact with the surface of the fiber material which is to be flameproofed, thereafter subjecting the carrier and the material to be finished to a heat treatment at 150° to 220° C until the halogen compound has been transferred to the fiber material, and then separating the finished material from the carrier.

3,992,561

PREPARATION OF SOLUTION POLYMERS

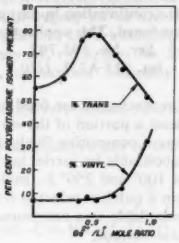
Ivan Glen Hargis, Tallmadge; Russell Anthony Livigni, and Sundar Lal Aggarwal, both of Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Filed July 7, 1975, Ser. No. 593,579

Int. Cl.² C08F *4/46*, *4/72*, *36/06*, *12/08*

U.S. Cl. 526—181 **10 Claims**

1. The method which comprises polymerizing under inert conditions in a hydrocarbon solvent at a temperature of from about −90° to 100° C. a polymerizable vinyl monomer selected from the group consisting of butadinen-1,3, isoprene, 2,3-dimethyl butadiene, styrene, alpha methyl styrene, p-tertiary butyl styrene, divinyl benzene, methyl vinyl toluene and para vinyl toluene and mixtures of the same, with a catalyst in a minor effective amount sufficient to polymerize said monomer to obtain a polymer and comprising a complex of (1)



$$Ba\left[(-O-\overset{R}{\underset{R}{C}}-R)_a \ (-OH)_b\right]_2$$

where at least one R is a methyl or cyclohexyl radical and where the remaining Rs are selected from the group consisting of alkyl and cycloalkyl radicals having from 1 to 6 carbon atoms which may be the same or different and where the mole ratio of a to b is from about 99.5:0.5 to 88:12 and (2) R'Li in which R' is selected from the group consisting of normal, secondary and tertiary alkyl and cycloalkyl radicals having from 2 to 20 carbon atoms, the mole ratio of (1) to (2) based on barium metal and lithium metal, being from about 0.30:1 to 0.75:1, said solvent being a solvent for said monomer and polymer.

3,992,562

MANUFACTURE OF INSOLUBLE AND ONLY SLIGHTLY WATER-SWELLABLE POLYMERS OF N-VINYL LACTAMS OF IMPROVED ADSORPTIVITY

Walter Denzinger, Speyer; Ernst Hofmann, and Karl Herrle, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 7, 1975, Ser. No. 593,761

Claims priority, application Germany, Aug. 5, 1974, 2437629

Int. Cl.² C08F *126/06*, *226/06*, *226/10*, *126/10*

U.S. Cl. 526—208 **7 Claims**

1. A process for the manufacture of insoluble and only slightly swellable homopolymers of an N-vinyl lactam or copolymers of two or more vinyl lactams selected from the group consisting of N-vinyl pyrrolidone, N-vinyl caprolactam and N-vinyl piperidone which comprises: polymerizing the vinyl lactam or the mixture of vinyl lactams in a dilute aqueous solution of said lactam or lactams at a pH of 6 to 10 with the exclusion of oxygen, said polymerization taking place in the presence of

a. divinyl ethylene urea, and

b. from 0.05 to 2% by weight, based on the vinyl lactam of at least one sulfur compound selected from the group consisting of sodium sulfide, sodium sulfite, sodium pyrosulfite, sodium dithionate, sodium sulfoxylate and sodium formaldehyde sulfoxylate.

3,992,563

HIGH TOUGHNESS SYNTHETIC HIGH POLYMERS FOR SOFT CONTACT LENSES AND A PROCESS FOR MANUFACTURING THE SAME

Kyoichi Tanaka, Nagoya, Japan, assignor to Toyo Contact Lens Company, Limited, Nagoya, Japan

Filed Mar. 17, 1975, Ser. No. 559,003

Claims priority, application Japan, Nov. 14, 1974, 49-131264

Int. Cl.² C08F 216/02

U.S. Cl. 526—219 4 Claims

1. A process for the manufacture of high toughness synthetic high polymers for soft contact lenses, comprising the steps of:

preparing a prepolymerization mixture by adding about 12 to 5 parts by weight of an n-amyl methacrylate monomer to about 80 to 92 parts by weight of a 2-hydroxyethyl methacrylate monomer, then adding about 5 to 2 parts by weight of a vinyl propionate monomer and about 3 to 1 part by weight of a vinyl acetate monomer followed by the addition of about 0.02 to 0.20 part by weight of an initiator for polymerization;

injecting said mixture into a mold;

heating said mixture from the outside of said mold, while maintaining the mold closed, consecutively at about 40° C for about 16 hours, then at about 60° C for about 4 hours, then at about 80° C for about 3 hours and then at about 100° C for about 2 hours to thereby effect copolymerization of said components;

cooling the product of said copolymerization from the outside of said mold; and

releasing said product from said mold.

3,992,564

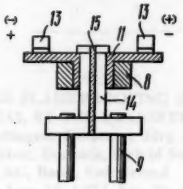
ELECTROSLAG REMELTING PLANT

Boris Izrailevich Medovar, ulitsa Anri Barbjusa, 22/26, kv. 109; Jury Fedorovich Alferov, bulvar Lepse, 29, kv. 64; Viktor Leonidovich Artamonov, ulitsa Shumskaya, 8a, kv. 90; Mikhail Elevich Berezovsky, ulitsa Lomonosova, 21/14, and Alexei Georgievich Bogachenko, ulitsa Miljutenko, 15/2, kv. 141, all of Kiev, U.S.S.R.

Continuation of Ser. No. 437,376, Jan. 28, 1974, abandoned, which is a continuation of Ser. No. 378,903, July 13, 1973, abandoned. This application Jan. 3, 1975, Ser. No. 538,248

Int. Cl.² H05B *7/103*

U.S. Cl. 13—16 **1 Claim**



1. A plant for electroslag remelting of consumable electrodes connected in a bifilar circuit, the plant comprising: a stringer; a bottom carriage being secured on the stringer so that it is free to travel in a vertical direction; a cooled mould being fastened to the bottom carriage and having a base plate positioned thereunder; drive means for transferring the bottom carriage in a vertical direction; a car having the base plate mounted thereon; drive means for transferring the car in a horizontal direction; a top carriage being secured on the stringer; an electrode holder having contact plates adapted to hold a single electrode therebetween and mounted on the top carriage; drive means for transferring the top carriage in a vertical direction; an electric power supply source having unlike poles thereof connected to the contact plates of the electrode holder; and a standard head for holding at least two consumable electrodes made up of two parts electrically isolated from each other, each of the parts being adapted for holding in place at least one of the two consumable electrodes and the standard head being secured in the electrode holder so that each of the parts contacts a respective contact plate of the electrode holder.

3,992,565

COMPOSITE WELDING CABLE HAVING GAS DUCTS AND SWITCH WIRES THEREIN

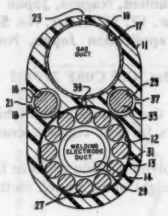
Edward W. Gatfield, Batavia, Ill., assignor to Belden Corporation, Geneva, Ill.

Filed July 7, 1975, Ser. No. 593,428

Int. Cl.² H01B *7/34*

U.S. Cl. 174—15 WF **9 Claims**

1. A welding cable comprising, a cable jacket having a first longitudinal passage therein, a welding current conductor disposed in said first longitudinal passage, said cable jacket having second and third longitudinal passages therein, switch wire means and a gas conductor tube disposed in said second and third longitudinal passages, said cable jacket including longitudinal openings therein coextensive with said second and third longitudinal passages communicating therefrom to the exterior of said jacket to facilitate insertion and removal



of said switch wire means and said gas conductor tube from said cable jacket.

3,992,566

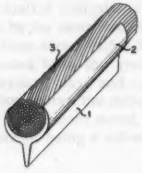
AERODYNAMIC AERIAL CONDUCTOR VIBRATION DAMPER

Jusif Museibovich Kerimov, 5 mikroraion, 15, kv. 3, Sumgait Azerbaidzhanskoi SSR, and Leib Aronovich Zaltsberg, ulitsa Armyanskaya, 1, Baku Azerbaidzhanskoi SSR, both of U.S.S.R.

Filed Jan. 21, 1974, Ser. No. 435,317

Int. Cl.² H02G *7/14*

U.S. Cl. 174—42 **5 Claims**



1. An aerodynamic vibration damper in combination with an aerial conductor, comprising an elongated plastic plate, plastic clamping means clamping said elongated plastic plate to said aerial conductor; said plastic clamping means being integral with said elongated plastic plate and comprising a split sleeve with an internal cavity following the cross-section of said aerial conductor; said internal cavity having lateral dimensions smaller than the corresponding external lateral dimensions of said aerial conductor, said split sleeve embracing a part of the surface of said aerial conductor, the dimensions of said part providing for an interference fit of said split sleeve on said aerial conductor; the ends of said split sleeve being thinner than the other part thereof, the thickness of said split sleeve increasing continually in the direction from the parted ends of said sleeve to said elongated plastic plate; said split sleeve being disposed relative to said elongated plastic plate so that its generatrix is directed along the latter.

3,992,567

INTERNAL STRESS-GRADING SYSTEM FOR ELECTRICAL CONNECTIONS

Michael W. Malia, Washington, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,614

Int. Cl.² H02G *15/08*; H01R *13/52*

U.S. Cl. 174—73 R **11 Claims**

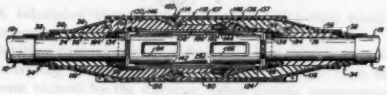
1. In an internal stress-grading system for protecting against deleterious electrical stress concentration in the vicinity of an

internal shield located within an electrical connection comprised of pre-molded, axially extending elastomeric connector component parts, the internal shield being located within said connector component parts and having axially extending radially inner and outer tubular segments each assembled with another at a joint between complementary radially inner and outer axial surfaces located along consecutive radially inner and outer segments, the radially inner segments each being located in a sleeve-like portion of a connector component part, said sleeve-like portion having a first portion of conductive elastomeric material, and a second portion of insulating elastomeric material contiguous with the first portion, said first and second portions being joined along a generally continuous, void-free juncture, the juncture following a continuous contour which has an arcuate salient profile defining the boundary of the first portion.

10. A composite sleeve for placement between the terminus of an electrical cable and an electrical connector housing having an inner conductive shielding layer and an outer conductive shielding layer, the cable having a conductor surrounded by an insulating jacket, said composite sleeve comprising:

a first sleeve portion of conductive elastomeric material at one end of the sleeve;

a second sleeve portion of insulating elastomeric material integral with and axially related to said first sleeve portion;



a third sleeve portion of conductive elastomeric material integral with and axially related to the second sleeve portion at the other end of the sleeve;

an axially extending external surface common to said first, second, and third sleeve portions;

a resiliently dilatable internal bore extending from end to end of the sleeve through said first, second, and third sleeve portions;

a first generally continuous, void-free juncture between said first and second sleeve portions, said first juncture extending from said internal bore to said external surface and following a continuous contour which has an arcuate salient profile defining the boundary of said first portion, said first sleeve portion forming an extension of said inner conductive shielding layer when said composite sleeve is disposed between said terminus and said housing; and

a second generally continuous, void-free juncture between said second sleeve portion and said third sleeve portion, said second juncture extending from said internal bore to said external surface, at least a portion of said second juncture extending from said internal bore following a continuous contour which has a flared profile relative to said internal bore and said second sleeve portion, said third sleeve portion forming an extension of said outer conductive shielding layer when said composite sleeve is disposed between said terminus and said housing.

3,992,568

ELECTRICALLY CONDUCTIVE PIPE COUPLING

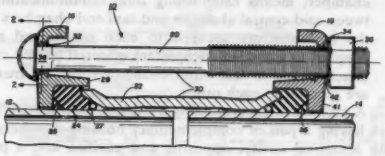
Rene Jan Al, Bradford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 478,667, June 12, 1974, abandoned. This application June 19, 1975, Ser. No. 589,486

Int. Cl.² H02G *15/02*; F16L *21/04*

U.S. Cl. 174—84 S **8 Claims**

1. In a pipe coupling including a sleeve-like middle ring in which to receive pipe ends to be coupled, an annular follower at each end of said middle ring dielectrically coated throughout, a gasket at each end of said middle ring intervening between the middle ring, follower and received pipe including conductive means for establishing electrical continuity between said middle ring, said followers and said pipe ends, a plurality of bolts each having a shank portion of non-circular cross section positioned in a non-circular aperture in said followers, a plurality of nuts each cooperating with one of said bolts for drawing said followers together to effect installation of a coupled joint, each of said bolts and said nuts being dielectrically coated throughout at least the area of potential surface contact with said followers with said bolts being



adapted to incur limited rotation within said apertures during the course of said joint installation, and clipless engagement means secured intervening between said shank portion of said bolts and at least one said aperture of said followers and operative by said bolts incurring said limited rotation in the course of effecting said joint installation to penetrate opposed coatings on the shank portion of said bolts and the follower aperture surface thereat until metal-to-metal engagement is encountered between said bolts and followers in establishing electrical contact engagement between said bolts and said followers.

3,992,569

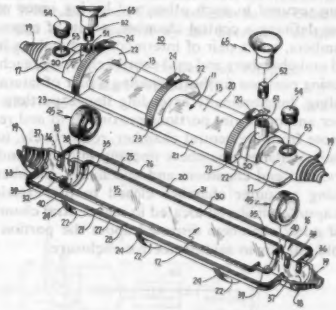
PROTECTIVE CABLE ENCLOSURE, CABLE ASSEMBLY INCLUDING THE SAME, AND METHOD OF ENCAPSULATING A CABLE IN A PROTECTIVE ENCLOSURE

Norman K. Hankins, Northridge, and Richard L. DeMonsy, Encino, both of Calif., assignors to Hexcel Corporation, Dublin, Calif.

Filed Feb. 11, 1975, Ser. No. 548,955

Int. Cl.² H02G *15/08*, *1/14*

U.S. Cl. 174—92 **18 Claims**



1. An apparatus for providing a protective enclosure for a cable, said apparatus comprising:

first and second complementary housing members adapted to be fitted to each other and defining a cable splice encapsulating housing when secured to each other, each housing member having a central body portion with an inner surface defining a central cavity forming a central chamber when the members are secured to each other, each member further including opposing end portions each with an inner surface defining an end cavity, and a

pair of laterally protruding, longitudinally extending flange portions terminating addjacent said end portions, said flange portions having inner and outer rim portions defining a longitudinal cavity therebetween in communication with said end cavities, the end cavities and the longitudinal cavities defining an outer chamber when the members are secured to each other, the outer chamber being comprised of end chambers in communication with longitudinal chambers, said rim portions closing the longitudinal chambers from the exterior of the housing and separating the longitudinal chambers from the central chamber, means establishing fluid communication between said central chamber and said end chambers when the members are secured to each other, and means adapted to admit an encapsulant material to said central chamber and to said outer chamber when the members are secured to each other.

7. A method of encapsulating a cable in a protective enclosure having a pair of complementary housing members each with a central cavity, opposing end cavities and a pair of longitudinally extending flange portions each having inner and outer rim portions for defining a flange cavity in communication with said end cavities, intermediate means for providing fluid communication between the central cavity and the end cavities, said complementary central cavities forming a central chamber and said end cavities and said flange cavities forming a continuous outer chamber longitudinally encircling the central chamber and closed to the exterior when said complementary housing members are mated, and means adapted to admit an encapsulant material to said central chamber and said end chamber, said method comprising the steps of:

a. arranging said cable in a first one of said housing members with the axis of said cable generally parallel to the axis of said housing member;

b. fitting the remaining one of said housing members to said first housing member to form said central and said outer chambers;

c. securing the fitted housing members to each other; and

d. thereafter pouring encapsulant compound into said chambers.

12. An enclosed cable assembly comprising:

a cable; and

a protective enclosure surrounding said cable, said protective enclosure comprising first and second complementarily configured housing portions constructed of a lightweight, moldable plastic material, the housing portions being secured to each other and having inner wall surfaces defining a central chamber, a pair of opposed end chambers, and a pair of intermediate chambers between said end chambers and said central chamber, each of said housing portions further including a pair of laterally protruding, longitudinally extending flange portions having inner and outer rim portions proximate to and relatively remote from the central chamber, respectively, to define a pair of flange chambers opening into said end chambers, said end chambers and said flange chambers comprising an outer chamber closed to the exterior, and encapsulant material located in said central chamber and said outer chambers disposed about the portion of said cable interior to said protective enclosure.

3,992,570

CABLE END SEALING DEVICES

Ernest Lloyd Beinhaur, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

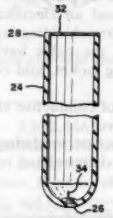
Continuation-in-part of Ser. No. 423,943, Dec. 12, 1973, Pat. No. 3,897,088, and a continuation-in-part of Ser. No. 451,620, March 15, 1974, abandoned. This application Oct. 23, 1974, Ser. No. 517,574

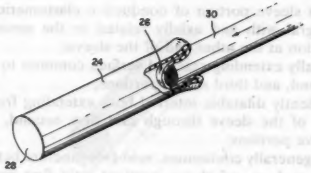
Int. Cl.[2] H02G *15/04*

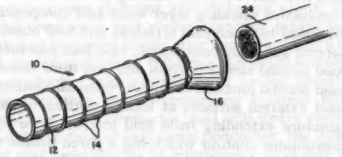
U.S. Cl. 174—135 **5 Claims**

1. A sealing device for effecting an environmental tight seal on a free end of a cable, conduit, or the like, said sealing device comprising:

a hollow unitary member of flexible resilient material including a cylindrical body, a conically outwardly flared portion extending from one end of said cylindrical body, an end wall closing the larger end of said conically flared portion, said end wall having a substantially greater thickness than the sidewalls of said body, and a plurality of annular bands spaced along the outer surface of said cylindrical body, means temporarily closing the other end of said hollow unitary member whereby pressing of the end wall against an end of a cable, conduit, or the like causes limited inflation of said hollow unitary member thereby easing passage of said end wall through said hollow unitary member until it sealingly engages such end







in an inside-out condition, said temporary closure means being removed by said through passage.

5. A sealing device for effecting an environmental tight seal on a free end of a member, such as a cable, conduit, or the like, said device comprising:

a hollow cylindrical member of inflatable material capable of withstanding low internal pressures, and having a permanently sealed first end, a frangible seal temporarily sealing a second end, and pointed means fixed to said permanently sealed first end which, when brought into contact with the second end of said device, causes the frangible seal to be ruptured thereby allowing passage therethrough of said first end, said device being reversible upon itself during application by pressing said first end against said free end and driving said first end through said hollow cylindrical member.

3,992,571

DIFFERENTIAL OPTICAL POLARIZATION DETECTORS

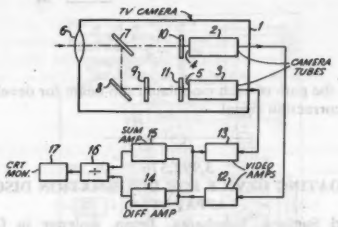
George Frederick John Garlick, Market Weighton; Gottfried Albert Steigmann, Cottingham, and William Edward Lamb, Little Weighton, all of England, assignors to National Research Development Corporation, London, England

Filed May 9, 1974, Ser. No. 468,584

Claims priority, application United Kingdom, May 11, 1973, 22586/73; Mar. 20, 1974, 12361/74

Int. Cl.² H04N 7/02

U.S. Cl. 178—6 4 Claims



1. A television system for detecting differential optical polarisation effects, said system comprising:

a television camera incorporating photosensitive means for generating, in response to illumination by light from the scene viewed by the camera, video signals representing the spatial variations in two dimensions over said scene of the intensity of illumination, and analysing means for causing said photosensitive means to be illuminated separately by linearly polarised parts of the light from said scene which have their respective vibration planes in two orientations at right angles to each other;

means for deriving separately from said photosensitive means two similar video signals respectively representing two-dimensional pictures of said scene respectively derived by means of two linearly polarised components of the light from said scene which differ only by having their respective vibration planes in said two orientations;

means for utilising said two video signals to generate a composite video signal representing the spatial variations in two dimensions over said scene of the degree of polarisation given by the ratio of the difference between the intensities of said components to the sum of the intensities of said components;

display means for displaying a two-dimensional television picture; and

means for utilising said composite video signal to cause the picture displayed by said display means to provide a representation of said spatial variations of said degree of polarisation.

3,992,572

SYSTEM FOR CODING TWO-DIMENSIONAL INFORMATION

Yukio Nakagome, Yokohama; Hiroichi Teramura, Tokyo; Yasuo Fukata, Mitaka, and Yasuhiro Yamasaki, Machida, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Sept. 3, 1974, Ser. No. 502,358

Claims priority, application Japan, Aug. 31, 1973, 48-97221; May 22, 1974, 49-57669

Int. Cl.² H04N 1/32

U.S. Cl. 178—6 3 Claims

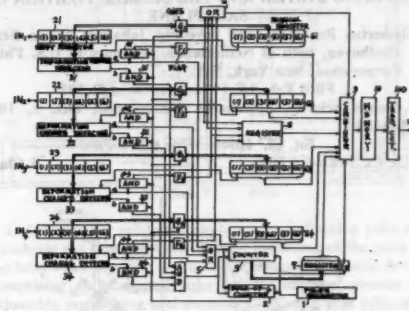
1. A system for coding two-dimensional information of M lines and N columns, comprising:

input terminal means for receiving said two-dimensional information;

first means connected to said input terminal means for developing M lines and U columns of said two-dimensional information as basic blocks wherein U N;

second means connected to said first means for detecting each basic block including at least one information change in any instant column information with respect to column information immediately preceding the instant column information;

third means connected to said first means and second means for coding information in the basic block detected by the second means;



fourth means connected to said first means for detecting when each column information has no information change with respect to the column information immediately preceding the instant column information;

fifth means connected to said first means and said fourth means for coding information corresponding to the number of columns of the basic block and the number of subsequent columns having no information change detected by the fourth means; and

output means connected to said third means and said fifth means for combining outputs of said third means and fifth means and for transmitting the combined output.

3,992,573

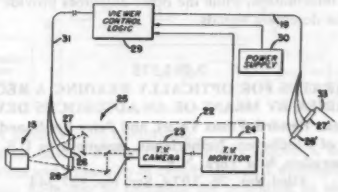
STEREOSCOPIC VIEWER POWER SUPPLY

Robert E. White, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1975, Ser. No. 633,523

Int. Cl.² H04N 9/54

U.S. Cl. 178—6.5 4 Claims



1. In a stereoscopic viewing system a power supply and synchronizer comprising:

means for developing a dc switching potential including two time-related waveforms;

control means connected to said switching potential means for applying said switching potential waveforms to a viewer having two complementary channels for selective length periods, and including timing circuit means which limits the total time duration of the application of the switching potentials to less than one-half of the total

viewing interval required to present a left-right image pair; and

logic circuit means connected to said control means for synchronizing the application of the switching potential with an external signal.

3,992,574

OPTO-ELECTRONIC SYSTEM FOR DETERMINING A DEVIATION BETWEEN THE ACTUAL POSITION OF A RADIATION-REFLECTING PLANE IN AN OPTICAL IMAGING SYSTEM AND THE DESIRED POSITION OF SAID PLANE

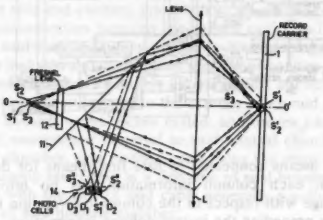
Gijsbertus Bouwhuis, and Josephus Johannes Maria Braat, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 14, 1974, Ser. No. 442,395

Claims priority, application Netherlands, Oct. 1, 1973, 7313454

Int. Cl.² H04N 5/76; G11B 7/00

U.S. Cl. 178—6.6 DD 5 Claims



1. An apparatus for reading a flat radiation reflecting record carrier on which information is recorded in an optically readable structure, comprising at least three radiation sensitive detectors, a radiation source, lens means for projecting the light from said radiation source to said record carrier and for projecting the light reflected from said record carrier to said radiation sensitive detectors along at least three different angularly separated paths, each path having a separate path axis that is angularly separated from the path axes of the other paths, said path axes being defined as the real center lines of the radiation along the three paths impinging on the radiation sensitive detectors and projections of the real center lines through each element of the apparatus, said lens means converging the radiation in the three paths at different convergence angles, the distance between said lens means and each of the detectors being substantially equal, one of said detectors providing an electrical signal corresponding to the recorded information, while the other detectors provide electrical focus detection signals.

3,992,575

APPARATUS FOR OPTICALLY READING A RECORD CARRIER BY MEANS OF AN AUTOFOCUS DEVICE

Christiaan Hendrik Frans Velzel, and Peter Ferdinand Greve, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

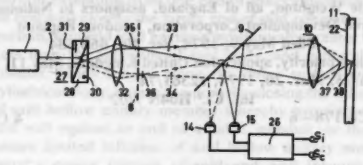
Filed Nov. 26, 1974, Ser. No. 527,244

Claims priority, application Netherlands, Feb. 25, 1974, 7402504

Int. Cl.² H04N 5/76; G11B 7/12

U.S. Cl. 178—6.6 R 5 Claims

1. Apparatus for reading a record carrier on which information is stored in an optically readable structure, comprising a radiation source providing a radiation beam, first element means for dividing said radiation beam into at least two sub-beams, second element means for focussing said sub-beams in different spatially separated planes located on either side of said optically readable structure, said optically readable structure thereby interacting with the sub-beams and providing modulated sub-beams, and a separate radiation sensitive detector in the path of each modulated sub-beam for developing a focus correction signal.



3,992,576

FLOATING DEVICE FOR INFORMATION DISC APPARATUS

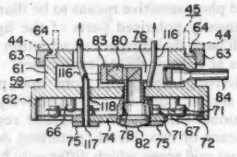
Yoshinori Sugiura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1974, Ser. No. 530,932

Claims priority, application Japan, Dec. 13, 1973, 48-140958

Int. Cl.² H04N 5/76; G11B 21/20, 17/32, 7/08

U.S. Cl. 178—6.6 DD 18 Claims



1. A floating device comprising in combination:

a. a floating surface providing a basis for floatation;

b. a fixing member provided in confrontation to said floating surface;

c. a movable member held by said fixing member in such a manner that the distance between said movable member and said floating surface is variable;

d. a floating body having a buoyancy with respect to said floating surface;

e. a resilient member which supports said floating body resiliently at the one side of said movable member facing said floating surface;

f. shifting means provided at at least one of, said fixing member and said movable member, for varying the distance between the said movable member and said floating surface;

g. detecting means mounted on at least one of, said movable member and said floating body, for detecting a relative position with respect to said movable member; and

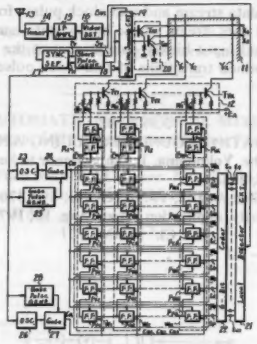
h. control means which causes said movable member to seperate from said floating surface by means of said shifting member, when said floating body has the least or no bouyancy, and also causes said movable member to shift toward said floating surface by means of said shifting means until the relative distance between the movable member and the floating body on the basis of a detected output from said detecting means reaches a predetermined value, when said floating body has buoyancy.

3,992,577

VIDEO DISPLAY SYSTEM

Yoshifumi Amano, Zushi, and Toshio Shionoya, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed June 24, 1975, Ser. No. 589,901
Claims priority, application Japan, June 28, 1974, 49-74008
Int. Cl.² H04N 3/10, 5/66
U.S. Cl. 178—7.3 D 8 Claims



1. A video display system comprising:

A. a display panel including a group of first parallel electrodes and a group of second parallel electrodes substantially perpendicular to said first electrodes;

B. a group of first driving circuits connected to said first parallel electrodes respectively;

C. a group of second driving circuits connected to said second electrodes respectively;

D. a video signal source for supplying a video signal;

E. a synchronizing signal separator connected to said video signal source for separating horizontal and vertical synchronizing signals from said video signal;

F. means supplied with said horizontal synchronizing signals for driving said first driving circuits sequentially in synchronism with said horizontal synchronizing signals;

G. means connected to said video signal source for sampling the level of the video signal and producing a digitally coded output signal for each video signal sample;

H. a group of first memory circuits connected to said second driving circuits respectively, each of the first memory circuits including a plurality of memory devices serially connected to form a shift register, an input terminal for supplying a digitally coded signal sequentially to said shift register, and a plurality of output terminals coupled to respective ones of the memory devices, said plurality of output terminals being connected to a corresponding one of said second driving circuits through resistors respectively;

I. a group of second memory circuits connected to the input terminals of said first memory circuits respectively, each of said second memory circuits being supplied with one of said digitally coded output signals such that said group of second memory circuits stores a representation of the video signal supplied during a predetermined interval; and

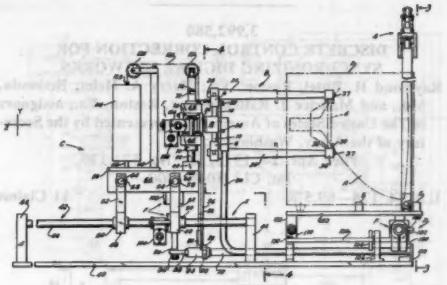
sequentially each digitally coded output signal stored in said second memory circuit to associated ones of said first memory circuits.

3,992,578

YOKE MOUNTING APPARATUS

Shigeru Igarashi, Kitchener, Canada, assignor to General Instrument of Canada Ltd., Canada

Filed Jan. 8, 1976, Ser. No. 587,862
Int. Cl.² H01F 1/00
U.S. Cl. 178—7.8 39 Claims



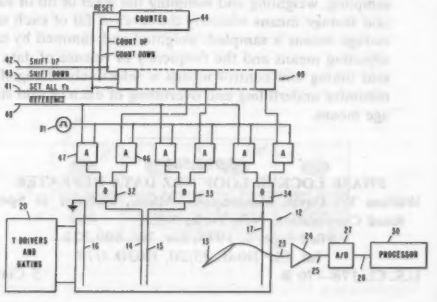
1. A device for relatively positioning a deflection yoke and a cathode ray tube to permit precise mounting of the yoke on the tube while the tube is situated in an enclosure, said device comprising an elongated yoke holding member, means for adjustably positioning said member relative to said tube, said means being located externally of the enclosure, said member being mounted on said means and extending outwardly therefrom and adapted to be positionable by said means to a point within said enclosure adjacent said tube, and control means operably connected to said position adjusting means and effective when actuated to adjust the position of said member.

3,992,579

TABLET SYSTEM WITH DIGITAL ACTIVATION

Herbert Dym, Poughkeepsie, and Stanley F. Kambic, Yorktown Heights, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 2, 1975, Ser. No. 583,350
Int. Cl.² G08C 21/00
U.S. Cl. 178—18 7 Claims



1. A tablet system comprising,

a tablet having a plurality of closely spaced X dimension wires and a plurality of closely spaced Y dimension wires,

means including an oscillator for providing an alternating sequence of binary voltage levels representing 1 and 0 logic values,

driver means for applying said aternating voltage level sequence to said wires, said driver means being individual to said wires for giving an individual wire a selected state of activation with said alternating voltage level sequence,

means for controlling said drivers to produce a selected pattern of activation of said wires in a selected dimension in which wires on one side of a selected tablet position are activated and wires on the other side of said selected

position are not activated and a transition in the activation pattern occurs at said selected position,

a pen positionable on the tablet to be capacitively coupled to said wires for receiving said alternating voltage level sequence signal, and

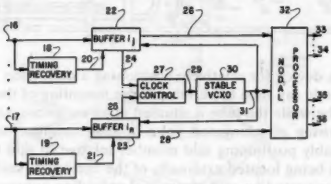
means for receiving said signal from said pen and for forming a pen positiion address in the selected dimension.

3,992,580

DISCRETE CONTROL CORRECTION FOR SYNCHRONIZING DIGITAL NETWORKS

Raymond H. Bittel, Reston, Va.; Harry A. Helm, Bethesda, Md., and Maurice J. Raffensperger, Reston, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 24, 1975, Ser. No. 571,175
Int. Cl.² H04L 7/00
U.S. Cl. 178—69.5 R **11 Claims**



1. In an n-node digital network, an apparatus for synchronizing the processing of data arriving at a node from other nodes comprising:

a. means for storing received data bits arriving from each interconnected node having an output connected to the input of a nodal processor;

b. means for timing and controlling the release of data from the output of each of said storage means connected to said storage means; and

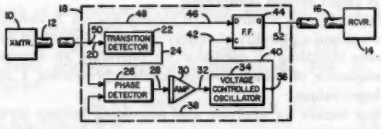
c. means for adjusting periodically the frequency of release of data by said timing and control means connected to said timing and control means, and having means for sampling, weighting and summing the level of fill of each said storage means whereby the level of fill of each said storage means is sampled, weighted and summed by said adjusting means and the frequency of release of data by said timing and control means is selectively changed to minimize underfilling and overfilling of each of said storage means.

3,992,581

PHASE LOCKED LOOP NRZ DATA REPEATER

William W. Davis, Minneapolis, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,323
Int. Cl.² H04L 25/20; H03D 3/18
U.S. Cl. 178—70 R **5 Claims**



1. A repeater network for reshaping and retiming a binary encoded data stream applied thereto, comprising, in combination:

a. a transition detector circuit connected to receive an input binary encoded data stream for producing a reference pulse each time said input binary coded data stream undergoes a predetermined change in signal level, said reference pulse having a predetermined width;

b. a voltage controlled oscillator for producing clock pulses having positive and negative transitions;

c. phase detector means for comparing the phase difference between said reference pulses and said clock pulses by comparing the time relationship of said negative transitions of said clock pulses to the midpoint of said reference pulses and producing an error signal proportional to said phase difference, said error signal being a nullity when said time relationship matches;

d. means for applying said error signal to said voltage controlled oscillator for modifying the frequency thereof; and

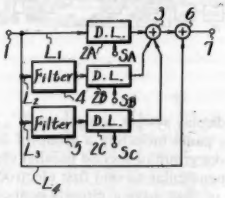
e. gating means connected to receive said input binary encoded data stream and said clock pulses for producing an output data stream whose binary state corresponds to that of said input binary data stream at the instant that predetermined transitions of said clock pulses occur.

3,992,582

REVERBERATION SOUND PRODUCING APPARATUS

Yoshio Osakabe, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 2, 1974, Ser. No. 494,370
Claims priority, application Japan, Aug. 13, 1973, 48-90694
Int. Cl.² H04M 1/21
U.S. Cl. 179—1 J **8 Claims**



1. A reverberation sound producing apparatus comprising:

a. an input terminal and an output terminal;

b. a plurality of signal paths connected in parallel with one another between said input and output terminals;

c. a filter connected in series with one of said plurality of signal paths and dividing an input signal applied to said input terminal into signals with different frequency bands;

d. electrical charge transferring delay means connected in at least one of said plurality of signal paths for delaying signals applied thereto such that said signals applied to said signal paths are delayed for a longer duration when said signals are of a relatively low frequency than when said signals are of a relatively high frequency; and

e. pulse signal means connected to said electrical charge transferring delay means to control the delay of signals passing through said delay means as a function of the repetition rate of pulses in said pulse signal.

3,992,583

UNIVERSAL FLEXIBLE ACOUSTIC COUPLER MUFF SYSTEM

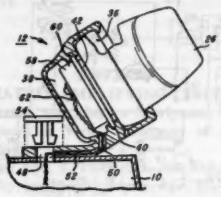
Jimmy H. Davis, and Larry E. Lamberth, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed July 11, 1975, Ser. No. 595,200
Int. Cl.² H04M 1/14
U.S. Cl. 179—1 C **17 Claims**

1. A universal acoustic muff comprising:

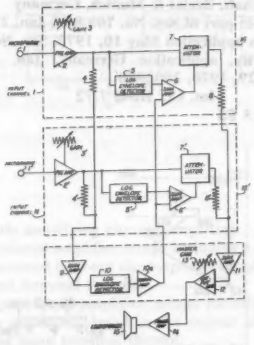
a housing including a speaker/microphone cavity and an earpiece/mouthpiece cavity separated by an acoustic

cavity,
a flexible mounting arm attached to said housing for mount-



ing said housing, and
means for rotatably mounting said arm to a member.

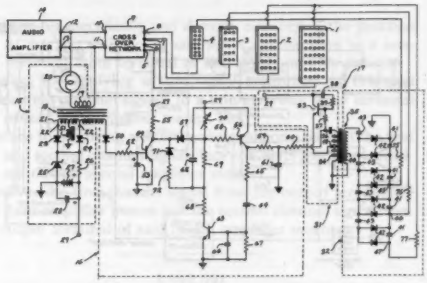
3,992,584
AUTOMATIC MICROPHONE MIXER
Daniel W. Dugan, 1024 Sacramento St., San Francisco, Calif. 94108
Filed May 9, 1975, Ser. No. 575,951
Int. Cl.² H04M 1/60
U.S. Cl. 179—1 AT 9 Claims



1. In a signal control system including a plurality of input signal channels for receiving a plurality of input signals, comprising a plurality of controllling means each receiving one of said input signals and each comprising means for multiplying said one input signal by the quotient of the average amplitude of said input signal divided by the average amplitude of the sum of all the input signals of all of said input channels and transmitting means for transmitting the output of each of said controlling means.

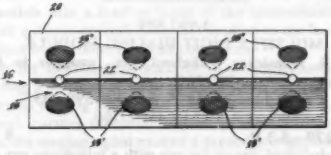
3,992,585
SELF-ENERGIZING ELECTROSTATIC LOUDSPEAKER SYSTEM
Jacob C. Turner; Douglas M. Elliott, both of Milwaukee, Wis.; Robert M. Grodinsky, Skokie, and Thomas F. Mills, Chicago, both of Ill., assignors to Koss Corporation, Milwaukee, Wis.
Filed Oct. 6, 1975, Ser. No. 620,537
Int. Cl.² H04R 3/00
U.S. Cl. 179—1 R 10 Claims

1. In an electrostatic loudspeaker system connected to receive an audio signal at an input terminal, a high voltage power supply for providing a polarizing voltage for an electrostatic driver the combination comprising:
a rechargeable battery operable when charged to generate a relatively low dc voltage;
a charging circuit connected to said battery and coupled to said input terminal, said charging circuit including rectifier means for generating a charging current to said rechargeable battery when an audio signal is applied to said input terminal;



a dc-to-dc converter circuit connected to said rechargeable battery and being operable when actuated to generate said polarizing voltage by boosting said relatively low battery voltage to a relatively high voltage; and
switch means for actuating said dc-to-dc converter circuit when an audio signal is applied to said input terminal.

3,992,586
BOARDROOM SOUND REINFORCEMENT SYSTEM
Christopher Jaffe, Norwalk, Conn., assignor to Jaffe Acoustics, Inc., Norwalk, Conn.
Filed Nov. 13, 1975, Ser. No. 631,537
Int. Cl.² H04R 27/00
U.S. Cl. 179—1 AT 9 Claims

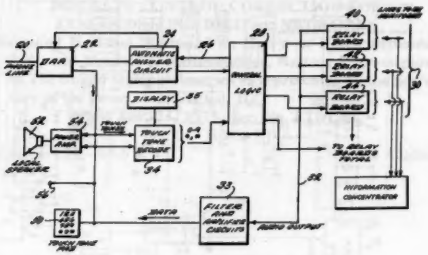


1. A sound reinforcement system for obtaining acoustical gain between a plurality of sound generating locations and a plurality of sound receiving locations separated from one another by a distance wherein at least some of the sound generating and the sound receiving locations are essentially joint comprising at least a pair of speakers positioned at each joint location, the speakers of the pair being driven out of phase with each other to provide an acoustical cancellation zone therebetween, at least one microphone positioned at each joint location, the microphone being positioned in the acoustical cancellation zone of the corresponding speaker pair of that location.

3,992,587
REMOTE DATA LINE MONITOR

Dennis E. Puckett; Dale A. Heatherington, both of Decatur, and Eugene C. Jones, Tucker, all of Ga., assignors to National Data Corporation, Atlanta, Ga.

Filed Aug. 19, 1974, Ser. No. 498,615
Int. Cl.² H04M *11/06*; H04Q *9/00*
U.S. Cl. 179—2 C **18 Claims**



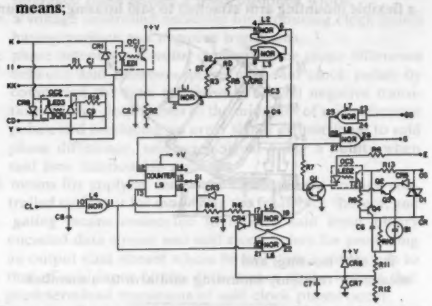
1. A data monitoring apparatus comprising:
a plurality of remote data lines,
information concentrating means for receiving information on a plurality of data lines and concentrating the information for transmission,
means for coupling said apparatus to a telephone line in response to receipt of a signal identifying said monitoring apparatus,
means defining an audio buss,
means for coupling said audio buss to said telephone line,
means associated with each of said data lines for coupling the associated data line to said audio buss,
means for receiving a coded telephone signal on said telephone line identifying one of a plurality of data lines at said apparatus and causing the coupling means associated with the identified data line to couple the identified data line to said audio buss,
said means for coupling said monitoring means to a telephone line comprising an automatic answering circuit connected to said telephone line for coupling said line to said apparatus upon receipt of a given signal, and answer means connected to said telephone line and responsive to receipt of a predetermined number of ring signals on said telephone line for producing said given signal and applying said given signal to said automatic answering circuit.

3,992,588
MULTIPLE DIGIT DIALING MODULE

William R. Hunsicker, Lakeland, Fla., assignor to Akzona Incorporated, Asheville, N.C.

Filed June 25, 1975, Ser. No. 590,003
Int. Cl.² H04M *17/00*
U.S. Cl. 179—6.3 R **9 Claims**

1. An electrical circuit for use with a telephone pay station comprising: a first input means for connection to a telephone number selection means;
a second input means adapted to be connected to the telephone hook switch;
means for generating a signal in response to each digit of the telephone number which has been selected, said signal generating means being connected to said first input means;
a digit counter connected to said signal generating means;
output means adapted to be connected to a telephone central office;
a phantom coin circuit; means for controlling said phantom coin circuit connected to said counter; said phantom coin circuit connected to said output means for providing an output signal on said output means in response to a signal on said second input means whereby a phantom coin is indicated to be present by the output signal on said output means;

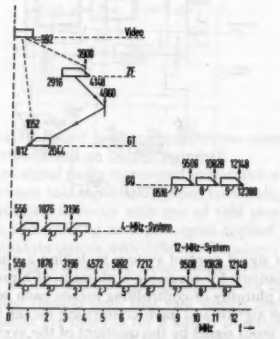


first means for removing said output signal from said output means in response to a predetermined number of telephone digits selected; said first means including said digit counter.

3,992,589
FREQUENCY MULTIPLEX SYSTEM FOR TRANSMISSION OF TELEPHONE AND VIDEOPHONE CHANNELS

Eberhard Kuegler, Germering, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 108,857, Jan. 27, 1971, abandoned. This application May 10, 1973, Ser. No. 358,961
Claims priority, application Germany, Jan. 29, 1970, 2004011; Jan. 29, 1970, 2003980
Int. Cl.² H04J *1/12*
U.S. Cl. 179—15 FS **14 Claims**



1. A frequency multiplex system which is employed for single side band transmission of telephone channels which are converted step-by-step into the position of the basic CCITT tertiary group 812–2,044 kHz by means of carriers representing integer multiples of 4 kHz, and thereafter converted in at least one step to transmission positions by means of carriers representing integer multiples of 8 kHz, and also employed for the transmission of videophone channels comprising means for transmitting respective videophone channels with residual side band and Nyquist slope in an entire bandwidth of a tertiary group including means for converting in at least one step the videophone channels from their video positions into the position of the CCITT basic tertiary group 812–2,044 kHz, means connected to the first-mentioned converting means for converting the videophone channels in at least one step into the transmission position as tertiary groups normally occupied by telephone channels, means connected to and providing carrier for the first-mentioned coverting means, each video carrier in the position of the basic tertiary group correspond-

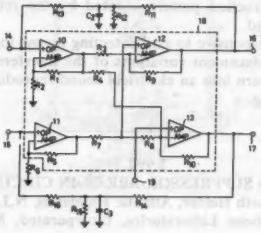
ing to the frequency zero in the video position and an odd multiple of 4 kHz, and means for providing a fixed line frequency of 8 kHz.

3,992,590

MATRIX AMPLIFYING CIRCUIT

Nobuaki Takahashi, and Masaru Moriyama, both of Yamato, Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Apr. 9, 1975, Ser. No. 566,228
Claims priority, application Japan, Apr. 15, 1974, 49-40889
Int. Cl.² H04R *5/00*; H04H *5/00*
U.S. Cl. 179—15 BT **3 Claims**



1. A matrix amplifying circuit comprising:

first operational amplifier means including a feedback resistor connected between the output terminal and an inverting input terminal thereof;

second operational amplifier means including a feedback resistor connected between the output terminal and an inverting input terminal thereof;

third operational amplifier means including a feedback resistor having a resistance value R9 which is connected between the output terminal and an inverting input terminal thereof;

fourth operational amplifier means including a feedback resistor having a resistance value R10 which is connected between the output terminal and an inverting input terminal thereof;

a first resistor connected between the inverting input terminal of said first amplifier means and ground;

a second resistor having a resistance value R3 which is connected between the output terminal of said first amplifier means and the inverting input terminal of said third amplifier means;

a third resistor having a resistance value R4 which is connected between the output terminal of said first amplifier means and in the inverting input terminal of said fourth amplifier means;

a fourth resistor connected between the inverting input terminal of said second amplifier means and ground;

a series combination of two resistors respectively having resistance values R7 and R8 which is connected between the output terminal of said second amplifier means and the inverting input terminal of said fourth amplifier means;

the resistance values R3, R4, R8, R9 and R10 satisfying the following equations:

$$\frac{R9}{R3} = \frac{R10}{R4}$$

and

$$R10 = \frac{R8(R3 + R9)}{R3};$$

means for electrically and directly connecting the junction of the two resistors in said series combination to a non-inverting input terminal of said third amplifier means;

means for applying a sum signal comprised of first and second channel signals to a non-inverting input terminal of said first amplifier means; and

means for applying a difference signal comprised of the first and second channel signals to a non-inverting input terminal of said second amplifier means

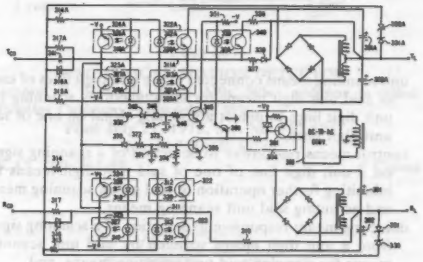
to deliver the first channel signal from the output terminal of said third amplifier means and the second channel signal from the output terminal of said fourth amplifier means.

3,992,591

TELEPHONE LINE BATTERY BOOST CIRCUIT

Edwin Coy Ingle, Julian, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 25, 1975, Ser. No. 571,868
Int. Cl.² H04B *3/36*; H04Q *1/30*
U.S. Cl. 179—16 F **12 Claims**



1. In a transmission line range extender of the polarity sensitive boost potential insertion type including directional current flow detectors for controlling insertion of a potential or potentials into a lead or leads of the transmission line to series aid a direct current potential applied to the leads of the line, wherein the improvement comprises,

means for inhibiting connection of potential into the line during a portion of each cycle of an applied alternating current ringing signal that the combined amplitudes of a direct current potential applied to the transmission line and the ringing signal exceed a prescribed amplitude level having a predetermined polarity opposite to the polarity of the applied central office direct current potential, wherein boost potential is insertable into the transmission line during the remaining portion of each cycle of the ringing signal.

3,992,592

SCANNER-MARKER ARRANGEMENT FOR TELEPHONE SYSTEM

Otto Altenburger, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

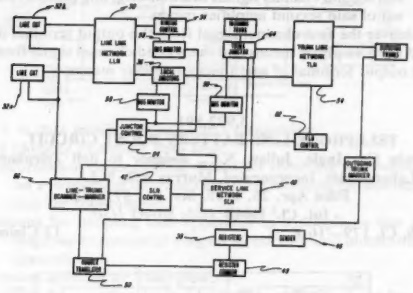
Filed Oct. 23, 1975, Ser. No. 625,057
Int. Cl.² H04M *3/22*
U.S. Cl. 179—18 FF **14 Claims**

1. In an automatic telephone system for effecting communication connections between selected ones of a plurality of

telephone circuits, including line circuits and trunk circuits, a scanner arrangement comprising

group scanning means for successively generating a scanning signal on respective scanning lines, each scanning line being connected in common to a corresponding group of line circuits and trunk circuits in respective sets of groups of such circuits and extending in common to each of the line circuits and trunk circuits of the respective groups to which they are connected,

a plurality of unit digit means each associated with a respective set of groups of line circuits and trunk circuits and each providing a plurality of unit digit lines each connected in common to a corresponding line circuit or trunk circuit of each group of the set for detecting a scanning signal on any one of the unit digit lines associated therewith,



unit scanning means connected to the unit digit lines of each of said unit digit means for simultaneously scanning the unit digit lines to detect a scanning signal on one of said unit digit lines,

control means responsive to detection of a scanning signal on a unit digit line of one of said unit digit means for inhibiting further operation of said group scanning means and actuating said unit scanning means,

detecting means responsive to detection of a scanning signal from a unit digit means scanned by said unit scanning means for stopping said unit scanning means, and

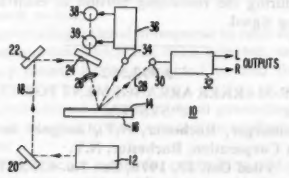
selection means responsive to said unit scanning means for sequentially connecting each unit digit means in turn to said detecting means each time said unit scanning means completes a scanning cycle.

3,992,593

DISC PHONOGRAPH RECORD PLAYBACK BY LASER GENERATED DIFFRACTION PATTERN

William K. Heine, 334 N. Woodland Road, Ben Lomond, Calif. 95005

Filed Aug. 22, 1974, Ser. No. 499,771
Int. Cl.² H04N 5/76; G11B 7/00
U.S. Cl. 179—100.3 V **12 Claims**



1. Apparatus for the playback of conventional disc phonograph records comprising a spiral recording groove having intersecting groove walls engraved in the disc surface and where flat land separates adjacent portions of the spiral groove, comprising:

a. a laser for providing a laser beam of light;

b. means for rotating a disc phonograph record to be played at the required rotational velocity;

c. means for directing said laser beam to illuminate the record groove to create an interference-diffraction pattern comprising an arc of light of variable radius which is radially displaced along a vector, above and below a middle unmodulated position, and whose maximum-to-minimum radial displacement relative to its unmodulated position is proportional to the actual groove wall displacement relative to its unmodulated position and represents the amplitude of the recorded signal, and wherein the rate of change of the radial displacement of the arc of light corresponds to the frequency of the recorded signal;

d. tracking means for maintaining said laser beam directed within the record groove as the disc phonograph record rotates;

e. means positioned to intercept the interference-diffraction pattern for detecting the displacements of the interference-diffraction pattern created by the reflected laser beam; and

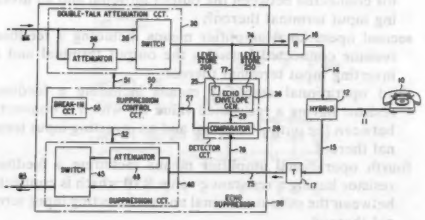
f. means responsive to said detecting means for converting said displacement variations of the interference-diffraction pattern into an electrical sound reproduction of the recording.

3,992,594

ECHO SUPPRESSOR BREAK-IN CIRCUITRY

George Kenneth Helder, Atlantic Highlands, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 10, 1975, Ser. No. 621,283
Int. Cl.² H04B 3/20
U.S. Cl. 179—170.6 **17 Claims**



9. In an arrangement for suppressing echos in a two-way communications system having first and second paths, means responsive to speech signals on said first path for inserting a suppression loss in said second path, and break-in means responsive to double-talking speech signals on said second path for removing said suppression loss, said break-in means including a detector circuit comprising

first means for storing a first signal representation which follows rising magnitudes of said first path signals and which decays at a predetermined rate during decreasing magnitudes of said first path signals,

second means for storing a second signal representation which follows rising magnitudes of said first path signals less a predetermined loss, and

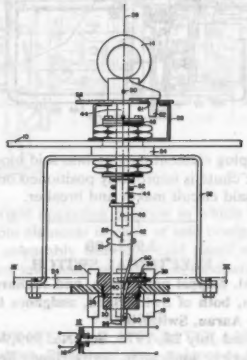
means for comparing said first and second signal representations to generate a signal approximating the anticipated second path echo for said first path signals.

3,992,595

NON-LOAD TAP-CHANGER SWITCH

Edgar R. Eley, Jefferson City, Mo., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,425
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² H01H *21/18*
U.S. Cl. 200—11 TC 9 Claims



1. A non-load tap-changer for tapped electrical windings, comprising:
a plurality of terminals;
means for supporting said terminals in an arc around a first axis;
a contact carrier located between said terminals and being rotatable around said first axis, said contact carrier having first and second openings therein which conjointly communicate with each other;
means for preventing movement of the contact carrier in a longitudinal direction along said axis;
a movable contact positioned in the first opening of the contact carrier and being dimensioned to contact two adjacent terminals;
a shaft extending into the second opening in the contact carrier, said shaft having an inclined surface thereon which is engageable with the movable contact;
means for permitting manual longitudinal movement of the shaft along said axis and manual rotational movement around said axis; and
resilient means for forcing the shaft and the inclined surface thereon in a longitudinal direction, with the inclined surface being in contact with and exerting an outward radial force on the movable contact when the movable contact is engaged with the two adjacent terminals.

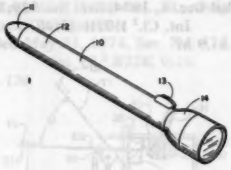
3,992,596

FLASHLIGHT SWITCH HAVING REMOVABLY MOUNTED CONTACT TERMINAL SECURING STRUCTURE

Jack V. Miller, Sierra Madre, Calif., assignor to Bianchi Leather Products, Inc., Temecula, Calif.

Filed June 30, 1975, Ser. No. 592,031
Int. Cl.² F21V *23/04;* H01H *1/00*
U.S. Cl. 200—60 4 Claims

1. A switch assembly for flashlights and the like comprising an elongated body of insulation material including portions defining a pair of mounting holes therethrough;
the upper surface of said body having an access opening for a switch operator;
the underside of said body including a recess communicating with said access opening;
a pair of resilient strip conductive members in spaced superimposed position and constituting the switching elements of the switch assembly;
a switch operator positioned in said recess and including a portion extending through said access opening;



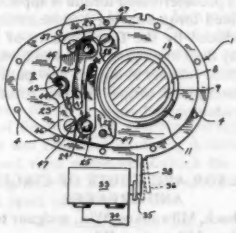
said operator being positioned over said conductive members wherein one position said operator biases said conductor members together and in a second position, allows said conductive members to separate thereby opening electrical connection therebetween;
said conductive members each including an integral tab portion extending in respective mounting holes of said body whereby electrical connection to said switch may be made by means of conductive fasteners passing through said mounting holes and fastening said body to a support structure.

3,992,597

MECHANICAL MOTION DETECTOR

Raymond H. Hannula, West Allis, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed July 21, 1975, Ser. No. 597,691
Int. Cl.² H01H *35/40*
U.S. Cl. 200—61.39 6 Claims



1. A mechanical motion detector for operating a switch in response to the rotation of a shaft, the combination comprising:
a housing which defines a fluid enclosure;
a driving gear disposed within said fluid enclosure and mounted for rotation therein, said driving gear being coupled for rotation by said shaft;
a driven gear rotatably supported by said housing and disposed within said fluid enclosure, said driving and driven gears each having teeth disposed around its circumference which sealingly engage with the walls of the fluid enclosure and which mesh with each other to define two fluid chambers;
a fluid passage formed in said housing and having an inlet to one of said fluid chambers and an outlet to the other fluid chamber;
a pressure responsive valve disposed within said fluid passage and including a spring which generates a force that

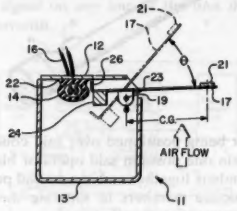
closes the valve to the flow of fluid through said fluid passage; and

means coupling the housing with the switch for operating the switch when the housing rotates.

3,992,598
AIRFLOW VELOCITY SWITCH

Richard Francis Welsh, Fremont; Philip James Beer, Mountain View, and Quinten La Marr Hazleton, San Jose, all of Calif., assignors to Afton Incorporated, Palo Alto, Calif.

Filed Dec. 4, 1974, Ser. No. 529,374
Int. Cl.² H01H *35/40*
U.S. Cl. 200—81.9 M **5 Claims**



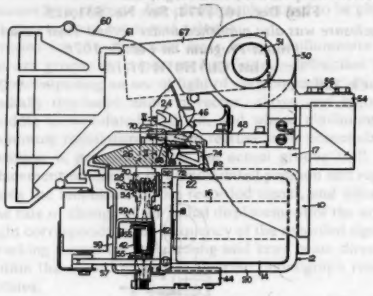
1. A switch sensing the flow velocity of a fluid along a vertical flow path in an upward direction comprising a vane having an upper downstream side and an upstream side exposed to the fluid flow, means for retaining said vane in horizontal disposition in the vertical flow path in the absence of flow of the fluid, means for mounting said vane for pivotal motion about a transverse axis so that the fluid flow urges said vane rotationally thereabout, a framework supporting said means for mounting, a magnetically actuated switch disposed on said framework, a magnet mounted on said vane for rotational movement therewith in and out of a position adjacent to said magnetically actuated switch, whereby said switch is actuated by a predetermined angle of rotational movement of said vane, and a predetermined mass fixedly attached to said downstream side of said vane spaced from said transverse axis, whereby airflow disruption by said predetermined mass is minimized and a predetermined torque is applied to said vane, said predetermined torque having a sense counter to that of the torque produced by the flow velocity of the fluid, the torque caused by fluid impinging against said vane at a predetermined fluid flow velocity along the flow path being greater than said predetermined torque thereby rotating said vane through said predetermined angle.

3,992,599
INTERLOCK FOR ARC CHUTE OF CIRCUIT MAKER AND BREAKER

Edward A. Halbach, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 470,568, May 16, 1974, abandoned. This application Apr. 21, 1975, Ser. No. 570,214
Int. Cl.² H01H *33/50*
U.S. Cl. 200—144 R **26 Claims**

1. In combination, a circuit maker and breaker including a stationary contact and a movable contact movable into engagement with said stationary contact, an arc chute adapted to be positioned on said circuit maker and breaker and defining an arcing compartment which embraces said stationary contact and said movable contact, an interlock means comprising an interlock member mounted for pivotal movement on said circuit maker and breaker, said interlock member including a plug element carried thereby, said interlock means additionally comprising a lever member engaging said interlock member and located in the path of positioning movement of said arc chute, whereby when said arc chute is properly positioned on said circuit maker and breaker means movable with said arc chute engages said lever member to pivotally move said interlock member to a position in which said plug element is moved out of blocking relation to movement of said movable contact into engagement with said stationary

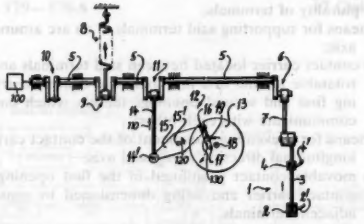


contact, said plug element moving into said blocking relation when said arc chute is improperly positioned on or is entirely absent from said circuit maker and breaker.

3,992,600
ELECTRICAL SWITCH

Hans Heutschi, Kappel near Olten, and Richard Thaler, Unterentfelden, both of Switzerland, assignors to Sprecher & Schuh AG, Aarau, Switzerland

Filed July 28, 1975, Ser. No. 599,946
Claims priority, application Switzerland, Sept. 28, 1974, 11700/74
Int. Cl.² H01H *35/38*
U.S. Cl. 200—153 R **9 Claims**



1. An electrical switch including a switch component, a drive mechanism for positively moving the switch component at a speed which can be varied in a pre-selected manner, branch drive means branched-off from said drive mechanism of the moved switched component, a movable additional mass connected with said branch drive means, said branch drive means possessing a transmission ratio which is variable as a function of the position of the moved switch component.

3,992,601
COVER FOR DISCONNECT SWITCH

Albert A. Zaffrann, and Grant W. Nelson, both Milwaukee, Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

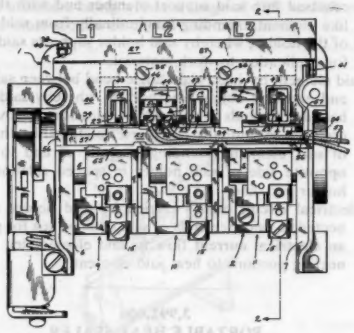
Filed Apr. 7, 1975, Ser. No. 565,382
Int. Cl.² H01H *9/02*
U.S. Cl. 200—295 **8 Claims**

1. In a disconnect switch having a base which defines compartments that house the elements of each switch pole, the improvement therein of a cover which comprises:

a mounting section that securely fastens to the front of said switch base and extends substantially across the entire lateral extent of said base;

hinge means connected to and disposed along a top edge of said mounting section;

a panel section connected to said hinge means for pivotal motion between a maintenance position and a substantially upright operating position in which it encloses selected pole elements in each of said compartments; and means for releasably fastening said panel section to said base when said panel section is in its operating position.

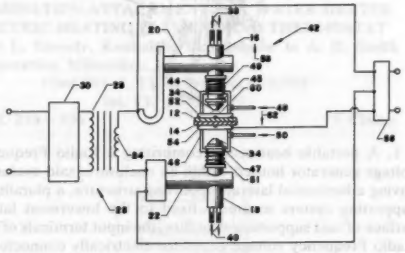


3,992,602

RESISTANCE WELDING APPARATUS AND METHOD

Richard F. Ashton, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Sept. 2, 1975, Ser. No. 609,779
Int. Cl.² B23K *11/10*
U.S. Cl. 219—91 **13 Claims**



6. A method of joining two superimposed electrically conducting members by resistance welding wherein two opposed work-contacting electrodes are utilized, which comprises the steps of:

a. arranging the working surface of one said electrode in spaced proximity to the exposed surface of the associated said member so as to define a space between the working surface of said one electrode and the adjacent area of said exposed surface,

b. filling said space with an inert gas,

c. inducing an electric arc across said space while maintaining said one electrode at a positive potential with respect to said associated member so as to clean said adjacent area,

d. inducing an electric arc across said space while maintaining said one electrode at a negative potential with respect to said associated member so as to clean the working surface of said one electrode,

e. arranging the working surface of said one electrode in contact with said adjacent area and the working surface of the other said electrode in contact with the exposed surface of the other said member at an opposed area substantially opposite to said adjacent area, whereby said members are gripped between said electrodes, and

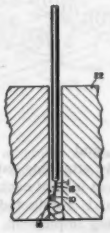
f. inducing an electric current across said electrodes and through said members gripped therebetween so as to fuse the faying surfaces of said members at areas intermediate to said adjacent area and said opposed area.

3,992,603

NARROW GAP WELDING TORCH

Richard W. Reynolds, Hazelcrest, Ill., assignor to Welding Research, Inc., Chicago, Ill.

Filed May 31, 1974, Ser. No. 474,972
Int. Cl.² B23K *9/16*
U.S. Cl. 219—136 **7 Claims**



1. A welding torch for practising the metal inert gas welding method within confined spaces comprising:

an electrically conductive supporting member adapted for attachment to a welding machine carriage;

a continuous length of heat and electricity conductive tubing folded upon itself with both ends engaging separate ports in the above mentioned supporting member;

a copper end plate having a cut out portion into which the folded over end of the said tube is nested and fastened so that the end plate lies in a plane passing through the longitudinal axis of the said tubing;

a second tubing of metal having a high melting point, hardness and wear resistance, press fitted within a hole formed in said end plate in close proximity to and in a direction essentially parallel to the said first tubing;

a heat and electrical insulating material covering the said copper end plate;

a coating of finely divided graphite particles covering the said heat and electrical insulating material;

and a second rigid member to which the first mentioned supporting member and the said end plate are attached and held apart one from another.

3,992,604

ELECTRICALLY HEATED ICE CREAM DISPENSER

James H. Leddy, High Point Mountain Road, West Shokan, N.Y. 12494

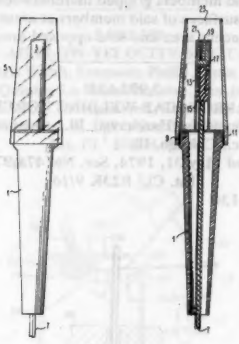
Filed Oct. 3, 1974, Ser. No. 511,749
Int. Cl.² H05B *1/00*; B28B *1/00*
U.S. Cl. 219—227 **6 Claims**

1. A frozen dessert ladling device comprising, in combination, a handle heating element assembly,

said assembly comprising a handle member, an electric heating element projecting from the forward end of said handle, and a protective shield carried by said end of said handle member and surrounding said heating element in spaced relation thereto,

said shield being at least coextensive in length with the exposed portion of said heating element so as to shield the entire length thereof, and having an open front end to provide access to the heating element in said shield,

said shield member being made of material sufficiently transparent to permit visual inspection of the sanitary condition of the area within said shield member including the inner surface thereof,



a ladling implement, and

means for removably attaching said ladling implement to said heating element in heat exchange relationship therewith whereby heat is conducted from said heating element to said ladling implement, said ladling implement extending outwardly through said open end of said shield.

3,992,605

ELECTRICALLY HEATED PARTING TOOL FOR REMOVING WINDSHIELDS

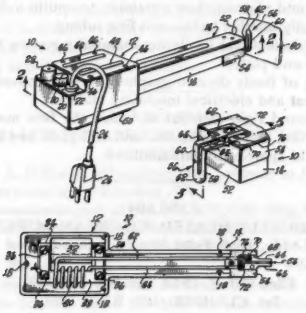
Hans Kraus, 5156 Banna Ave., Covina, Calif. 91724, and Wesley R. Willhite, Jr., 1345 N. Birchnall Ave., San Dimas, Calif. 91773

Filed Apr. 23, 1974, Ser. No. 463,388

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² H05B *1/00*; **B26B** *3/08*

U.S. Cl. 219—233 **3 Claims**



1. A parting tool comprising:

an elongate blade-like element constructed of relatively thin flat sheet metal and having base and tip ends, said element having a longitudinal slot opening at one end through the base end of said element and terminating at its other end a distance from the tip end of said element, whereby said element has a generally U-shape including a pair of thin flat leg portions disposed in spaced side by side coplanar relation and a thin flat connecting portion joining said leg portions at the tip end of said element, said leg portions having opposite free ends,

a realtively long and slender holder having at one end a high temperature heat resistive ceramic-like thermal insulating support member recessed into one side of said holder,

means securing said free ends of said element leg portions to said insulating support member with said free ends recessed into said support member and with the blade-like element extending longitudinally from said one end of the holder, whereby said holder supports said element for application to work material,

said element having a right angle bend between said holder end and said connecting portion whereby said element base and tip ends lie at opposite sides of said bend and are disposed in mutually transverse relationship, the tip end of said element extending laterally of and toward the opposite side of said holder in spaced relation to said holder end, and

electrical circuit means carried by said holder and connected to said free ends of said element leg for providing an electrical current flow to said element leg and connecting portions to heat said element.

3,992,606

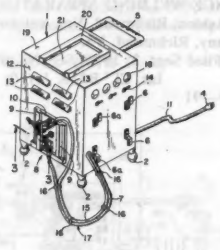
PORTABLE HEAT SEALER

Kennuth Arutt, Hewlett Harbor, and William Hall, N. Babylon, both of N.Y., assignors to Cosmos Electronic Machine Corporation, Farmingdale, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,271

Int. Cl.² H05B *1/00*

U.S. Cl. 219—243 **10 Claims**



1. A portable heat sealer comprising a Radio Frequency voltage generator housed within an enclosure, said enclosure having a horizontal lateral supporting structure, a plurality of supporting casters securedly fixed to the lowermost lateral surface of said supporting structure, the input terminals of said Radio Frequency voltage generator electrically connected to a flexible input line voltage power cable, the output terminals of said Radio Frequency voltage generator electrically connected to the input end of a flexible power output cable, a portable remote operating heat sealing press electrically connected to the output end of said flexible power output cable, means to temporarily secure in a storage position said portable remote operating heat sealing press to the exterior of said enclosure.

3,992,607

ELECTRICALLY HEATED HOT WATER SYSTEM

Jacques R. Jolin, 1017 rue Rolland-Therrien, Longueuil, Quebec J4J 3L4, Canada

Filed Apr. 25, 1975, Ser. No. 571,571

Int. Cl.² F24H *1/18*

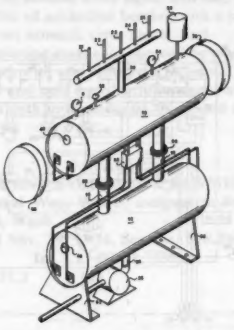
U.S. Cl. 219—314 **5 Claims**

1. An electrically heated hot water system comprising,

two superposed interconnected closed containers having a substantially uniform and equal cross-section,

a water inlet provided near the bottom of the lower container and a water outlet provided near the top of the upper container,

at least two separate vertical tubular members having a substantially uniform horizontal cross-section and extending between the lower and upper containers for allowing the water of the lower container to raise into the upper container, the sum of the cross-sections of both tubular members being within a range of 16% to 36% of the said cross-section of one of said containers,



electrical heating means disposed in each container for heating the water adapted to be contained in the said containers, and

thermostatic control means for each container connected to the heating means contained therein,

whereby, the water heated in said containers by said heating means is raised from the lower container to the upper container through said tubular members.

3,992,608

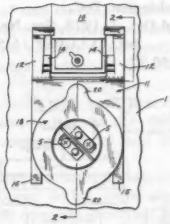
COMBINATION ATTACHMENT FOR WATER HEATER ELECTRIC HEATING ELEMENT AND THERMOSTAT

Robert L. Snavely, Kankakee, Ill., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Oct. 1, 1975, Ser. No. 618,562

Int. Cl.[2] F24H *1/00*

U.S. Cl. 219—336 **5 Claims**



1. A combination electric heating element and thermostat attachment to a water heater tank, which comprises an external fitting secured around an opening in a wall of the water heater tank, a pair of oppositely disposed flange members located on the fitting adjacent the outer end, a bracket disposed to hold the thermostat against the wall of the tank and having a pair of arm members extending respectively over the wall of the tank on opposite sides of the fitting, abutment means secured to one pair of said flange and arm members and disposed to securely hold said bracket and the thermostat securely against the wall of the tank, means preventing rotation of the bracket when the arm members are in engagement with the flange members of the fitting, and locking means overlying the flange members of the fitting and having means thereon selectively disposed in engagement with the fitting flange members and electric heating element to secure the electric heating element securely to the fitting.

3,992,609

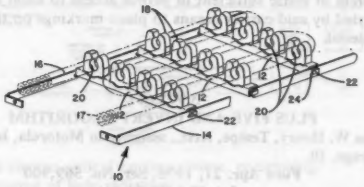
SUPPORT MEMBER FOR ELECTRIC HEATING ASSEMBLY AND METHOD OF MANUFACTURING

Donald E. Alexander, Knoxville, Tenn., assignor to Carrier Corporation, Syracuse, N.Y.

Filed June 30, 1975, Ser. No. 591,798

Int. Cl.[2] H05B *3/06*

U.S. Cl. 219—532 **1 Claim**



1. In an electric heating assembly of the type having a plurality of electrical heating elements supported by electrical insulators shaped in the form of an inverted tee and having substantially circular openings supporting the electrical heating elements, an electrical insulator support comprising:

a channel shaped support structure with a channel sized to slidably receive electrical insulators and including a plurality of tab-like strips integrally extending from at least one side of the channel-like structure in axially spaced apart relation, the width of said tab-like strips being substantially equal to the width of adjacent ends of the tee-like electrical insulators, said strips lying in a horizontal plane in intimate contact with said adjacent ends of said tee-like insulators to lock said insulating members in position on said support structure.

3,992,610

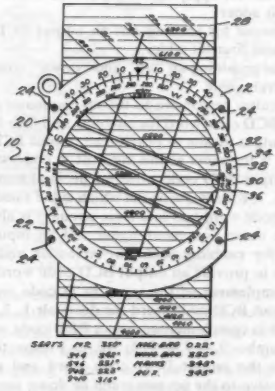
WEIGHT AND BALANCE CALCULATOR

Jerry L. Kennedy, Southern Illinois Airport, Carbondale, Ill. 62901

Filed July 7, 1975, Ser. No. 593,246

Int. Cl.[2] G06G *1/14, 1/16*

U.S. Cl. 235—61 T **5 Claims**



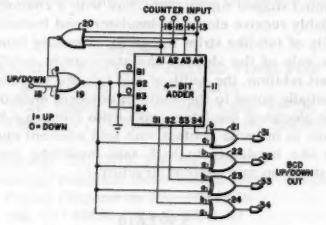
1. A manually operated weight and balance calculator for determining load position tolerances in an aircraft, said calcu-

lator having one side and another side, said one side including carrier means for flat sheet material containing indicia characteristic of a selected aircraft, said other side of said calculator including disc member retaining means having a portion for carrying indicia markings, a circular disc member rotatably retained by said retaining means so that said disc member is rotatable relative to said retaining means about an axis which extends substantially perpendicular to the sheet material when the sheet material is carried by said carrier means, said disc member having a portion for carrying indicia markings selectively alignable with indicia markings on said portion of said retaining means by relative rotation of said disc member and retaining means, said disc member further including a transparent plate member, said plate member having a slot formed therein of a size sufficient to permit access to sheet material carried by said carrier means to place markings on the sheet material.

3,992,611
PLUS FIVE AND INVERT ALGORITHM

Tim W. Henry, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Apr. 21, 1975, Ser. No. 569,900
Int. Cl.² G06M *3/14*
U.S. Cl. 235—92 EV **5 Claims**



1. A four-bit binary coded decimal (BCD) conversion circuitry for converting an input BCD code word into an output BCD code word, said conversion circuitry comprising:

a four-bit adder,

input means for applying the input BCD code word to said four-bit adder,

output means for sending out an output BCD code word from said four-bit adder,

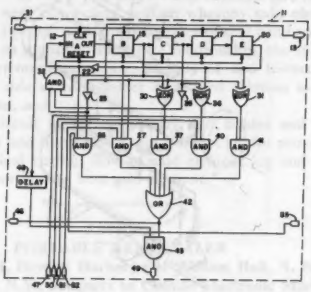
means for providing an "up" and "down" command signal selectively, and

logic circuitry responsive to the up command signal and an input BCD code word for enabling said four-bit adder and said output means to provide an output BCD code word which is the same as the input BCD code word whereby the output BCD code word for decimal numbers 1, 2, 3, 4, 5, 6, 7, 8, or 9 is sent out which is the same as the input BCD code word and said logic circuitry is also responsive to the down command signal and an input BCD code word for enabling said four-bit adder and said output means to provide an output BCD code word which is the 9's complement of the input BCD code word, whereby the input BCD code word for decimals 1, 2, 3, 4, 5, 6, 7, 8, or 9 is complemented into a BCD code word for decimal number 9, 8, 7, 6, 5, 4, 3, 2, or 1 respectively and sent out as the output BCD code word and said circuitry responsive to the up command or down command signal and input BCD code word 0 for enabling said four-bit adder and said output means to provide an output BCD code word 0.

3,992,612
RATE MULTIPLIER

Gerald A. Dunn, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 14, 1975, Ser. No. 622,341
Int. Cl.² G06F *15/20;* **H03K** *21/00*
U.S. Cl. 235—150.3 **4 Claims**



1. A first apparatus for the generation of an output pulse train having a frequency which is a controllable fraction of an input pulse train, comprising:

a source of input pulse signals;

a Johnson counter to which said signals are applied, said counter having a predetermined number of stages and which steps through a predetermined count cycle at a stepping rate equal to the input pulse rate;

an output terminal;

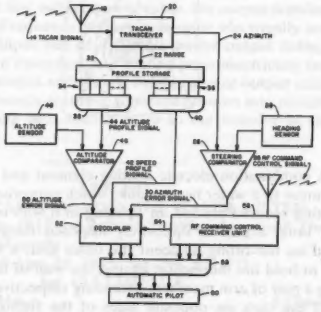
means for detecting predetermined combinations of count values within the counter, and

means for controlling said detecting means to regulate the number of pulses applied to the output during each count cycle.

3,992,613
TACAN FLYING TARGET CONTROL SYSTEM

Dean Blatchford, Woodland Hills, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,555
Int. Cl.² G06F *15/50*
U.S. Cl. 235—150.27 **13 Claims**



1. A target guidance system for directing a flying target along a preselected altitude and speed profile in a radial beam heading toward an object under simulated attack comprising:

a. means within said target for producing a first signal representative of range to said object and a second signal

representative of azimuthal bearing to said object from a TACAN signal radiated from said object,

b. storage means addressed by said first signal for producing an altitude profile signal and a speed profile signal stored in said storage means at address locations corresponding to said range to said object,

c. means for comparing said altitude profile signal with a signal representative of actual altitude of said flying target to produce an altitude error signal and said second signal representative of azimuthal bearing with a heading signal to produce an azimuth error signal; and

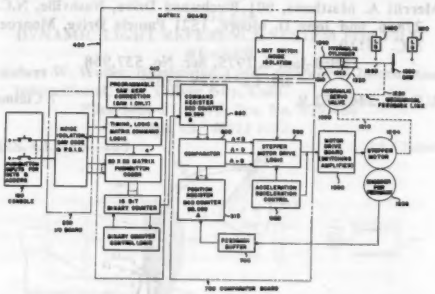
d. automatic piloting means for controlling said flying target in accordance with said altitude error signal, said azimuth error signal and said speed profile signal along a preselected flight path independently of ground control.

3,992,614

SAW POSITIONING SYSTEM FOR SAWMILL EDGER

Jack Buss, Federal Way, Wash., assignor to Pre-Con, Inc., Mercer Island, Wash.

Filed Nov. 29, 1974, Ser. No. 528,560
Int. Cl.² B26D 7/26
U.S. Cl. 235—151.1 **4 Claims**



1. A control system for positioning a plurality of saws, comprising:

a mechanical control element for each saw;

means for producing an electrical command signal for each control element, said command signal corresponding to a desired position of said mechanical control element;

means for producing an electrical position signal for each mechanical control element, said position signal corresponding to the actual position of said mechanical control element;

a comparator associated with each saw for generating an error signal corresponding to the difference in value between each command signal and its corresponding position signal;

means for moving said mechanical control elements in one direction in response to an error signal having one polarity and in the opposite direction in response to an error signal having the opposite polarity;

a mechanical feedback element having a position determined by the absolute position of one saw, said saw constituting a reference saw;

a mechanical feedback element for each remaining saw, said mechanical feedback element having a position determined by the position of its corresponding saw relative to its adjacent saw intermediate said reference saw;

actuating means for positioning each saw responsive to the difference in position between its corresponding feedback and control elements; and

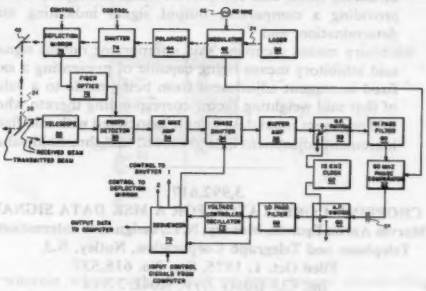
calibrating means comprising means for moving each saw to a predetermined position and means for presetting said counter to a value corresponding to said predetermined position.

3,992,615

ELECTRO-OPTICAL RANGING SYSTEM FOR DISTANCE MEASUREMENTS TO MOVING TARGETS

Robert R. Bennett, and John C. Nosler, both of Eugene, Oreg., assignors to Sun Studs, Inc., Roseburg, Oreg.

Filed May 14, 1975, Ser. No. 577,312
Int. Cl.² G06G 7/78; G01C 3/08
U.S. Cl. 235—151.32 **13 Claims**



2. An electro-optical ranging system, comprising:

a. a source of light radiation;

b. means for amplitude modulating light radiated from said source by a reference signal;

c. photo-electric means responsive to said modulated light radiation after it has traveled from said source over a distance to be measured for demodulating said light radiation to produce a detected signal;

d. phase comparator means responsive to said reference and detected signals for determining their relative phase and producing a signal representative thereof;

e. phase shifter means for introducing an adjustment of the relative phase of said reference and detected signals by an amount proportional to a predetermined distance; and

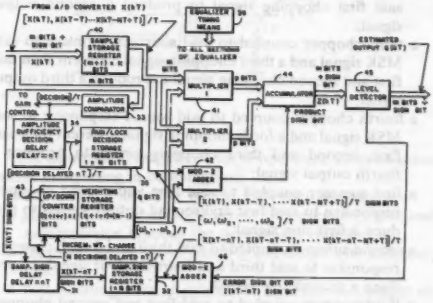
f. means responsive to said relative-phase signal for calculating said distance to be measured by interpolation based upon said predetermined distance and said relative-phase signal.

3,992,616

RECEIVER EQUALIZER APPARATUS

William F. Acker, Seminole, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed June 24, 1975, Ser. No. 589,954
Int. Cl.² H04B 3/04; G06F 7/38
U.S. Cl. 235—156 **37 Claims**



1. An improvement in a signal filter having an adaptable filter characteristic for filtering input signals, said signal filter being a transversal filter equalizer achieving said adaptable filter characteristic through fixed increment adjustments of values of weighting factors used for multiplying input data samples in said input signal, said fixed increment adjustment either increasing or decreasing a first value of a corresponding weighting factor depending on (i) a sign of an error sample in

a discrete time error signal provided by said signal filter, and on (ii) a sign of a pertinent input data sample, taken from said input signal, which is weighted, in providing said error sample, by a second value of said corresponding weighting factor, said improvement in said filter comprising:

a comparator means to provide a determination of whether said input data samples have values which exceed a threshold value, said comparator means being capable of providing a comparator output signal indicating said determination; and

inhibitory means receiving said comparator output signal, said inhibitory means being capable of preventing a said fixed increment adjustment from being made to a value of that said weighting factor corresponding thereto when said pertinent input data sample associated with said fixed increment adjustment fails to exceed said threshold value.

3,992,617

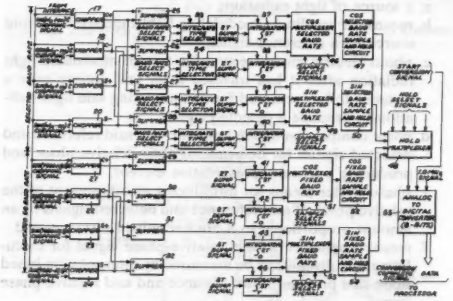
CHOPPING CORRELATOR FOR A MSK DATA SIGNAL

Marvin Aaron Epstein, Monsey, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 1, 1975, Ser. No. 618,537

Int. Cl.² G06G 7/19; H04L 27/14

U.S. Cl. 235—181 **13 Claims**



1. A chopping correlator for a minimum shift keying (MSK) data signal comprising at least:

a source of said MSK signal;

a first chopper coupled to said source responsive to said MSK signal and a first chopping signal to produce a first output signal;

a second chopper coupled to said source responsive to said MSK signal and a second chopping signal different than said first chopping signal to produce a second output signal;

a third chopper coupled to said source responsive to said MSK signal and a third chopping signal different than said first and second chopping signal to produce a third output signal;

a fourth chopper coupled to said source responsive to said MSK signal and a forth chopping signal different than said first, second and third chopping signal to produce a fourth output signal;

a first summer coupled to said first and second choppers responsive to said first and second output signals to produce a first sum signal;

a second summer coupled to said third and fourth choppers responsive to said third and fourth output signals to produce a second sum signal;

a third summer coupled to said first and second choppers responsive to said first and second output signals to produce a third sum signal;

a fourth summer coupled to said third and fourth choppers responsive to said third and fourth output signals to produce a fourth sum signal;

a first integrator coupled to said first summer to integrate said first sum signal over a first predetermined number of given time intervals to produce a first integrated signal;

a second integrator coupled to said second summer to integrate said second sum signal over a second predetermined number of given time intervals equal in number to non-time coincident with but overlapping said first predetermined number of given time intervals to produce a second integrated signal;

a third integrator coupled to said third summer to integrate said third sum signal over a third predetermined number of given time intervals equal in number to and time coincident with said second predetermined number of given time intervals to produce a third integrated signal;

a fourth integrator coupled to said fourth summer to integrate said fourth sum signal over a fourth predetermined number of given time intervals equal in number to and time coincident with said first predetermined number of given time intervals to produce a fourth integrated signal; and

means coupled to at least said first, second, third and fourth integrators to produce as an output signal of said correlator a digital representation of the data generated by said first, second, third and fourth integrated signals.

3,992,618

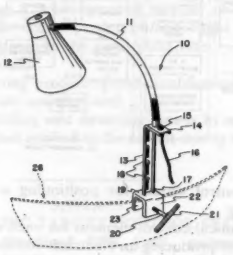
GRILL ILLUMINATING MEANS

Merritt A. Matthews, 801 Birchwood Drive, Nashville, N.C. 27856, and John D. Moore, 1521 Pamela Drive, Monroe, N.C. 28110

Filed Jan. 2, 1975, Ser. No. 537,958

Int. Cl.² F21V 21/00

U.S. Cl. 240—52 R **7 Claims**



1. A heat dissipating light support for use with an outdoor charcoal type grill comprising a light source disposed adjacent said grill; means for securing said light source adjacent one end of a multi-position, adjustable support means; elongated heat dissipating means connected at one end to said support means adjacent its end opposite said light source; and clamp means connected to the end of said heat dissipating means opposite said support means whereby said light source can be operatively and adjustably mounted on said grill for isolating said light source from the heat generated by said grill.

3,992,619

OPTICAL SCANNER

Lyman F. VanBuskirk, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 23, 1975, Ser. No. 589,161

Int. Cl.² G01J 1/20

U.S. Cl. 250—203 R **7 Claims**

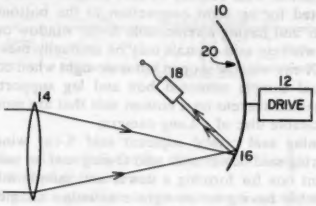
1. An optical scanner for measuring the placement of an emission source in the field of view of the scanner, comprising:

a rotatable structure having a curved surface with a predetermined pattern of reflective and non-reflective portions near the perimeter of said surface;

means for rotating said structure;

means for focusing an image of said source on an area of said surface occupied by said portions; and

means for detecting the image reflected by said reflective portions;



wherein the rotational orientation of the surface is identified for each detection such that the sum of all said identified orientations measures the placement of said source within said field of view.

3,992,620

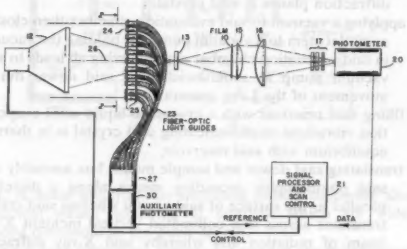
DYNAMIC LIGHT REFERENCE SYSTEM FOR FILM READER

Robert W. Waller, Northridge, Calif., assignor to Information International, Inc., Culver City, Calif.

Filed May 21, 1975, Ser. No. 579,486

Int. Cl.² G01J 1/32

U.S. Cl. 250—205 15 Claims



1. In a film reader, apparatus for generating a dynamic reference signal proportional to the intensity of light radiated from a source to a film, without interrupting or blocking any flux radiated from the source to the film through an optical system, comprising a photometer and means for collecting peripheral flux directly from around the path between said source and said optical system at evenly spaced locations around said source and said optical system at evenly spaced locations around said optical path and means for guiding radiation flux thus collected at each location to said photometer, and means for integrating and converting collected radiation flux into an electrical signal.

3,992,621

FAST TRIPLANAR DETECTOR WITH COAXIAL CONNECTOR OUTPUT

Edward H. Eberhardt, Fort Wayne, Ind., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 23, 1975, Ser. No. 625,291

Int. Cl.² H01J 39/12

U.S. Cl. 250—207 7 Claims

1. A radiation sensitive detector comprising:

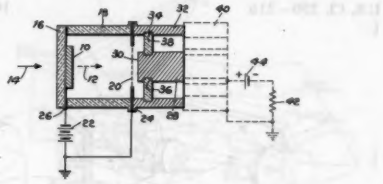
means for emitting electrons in response to radiation,

means for accelerating said electrons,

means for collecting said accelerated electrons,

said accelerating means being positioned closer to said collecting means than to said emitting means,

means applying an electron accelerating potential between said accelerating means and said electron emissive means, said collector and accelerating means being at substantially the same potential, and



wherein when each of said emitting means accelerating means and collecting means are planar and parallel, and

a coaxial output connector having inner and outer concentric conductors for connection to a coaxial line, said accelerating means including a mesh electrode connected to one of said conductors, and said collecting means including an anode connected to the other conductor.

3,992,622

LOGARITHMIC AMPLIFIER WITH TEMPERATURE COMPENSATION MEANS

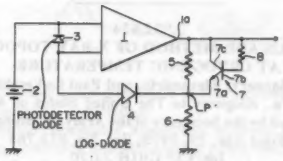
Saburo Numata; Shinichiro Fujino, both of Urawa, and Masanoshin Komori, Omiya, all of Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Nov. 21, 1975, Ser. No. 634,145

Claims priority, application Japan, Nov. 25, 1974, 49-135747

Int. Cl.² G06G 9/00

U.S. Cl. 250—214 C 3 Claims



1. A logarithmic amplifier with temperature compensation means comprising in combination:

an operational amplifier having high input impedance,

a photodetector connected across the inversion input and non-inversion input of the operational amplifier,

a log-diode the anode of which is connected with said photodetector,

a first dividing resistor connected between the output of said operational amplifier and the cathode of said log-diode,

a second dividing resistor connected between the cathode of said log-diode and the ground, and

a transistor the collector of which is connected with the output of said operational amplifier and the emitter of which is connected with the cathode of said log-diode,

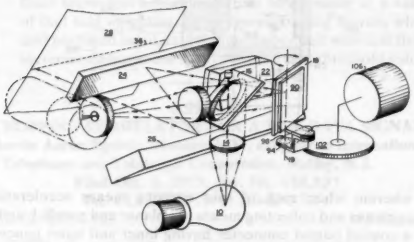
whereby the temperature characteristic of the log-diode and that of the amplification factor of said transistor offset each other.

3,992,623

OPTICAL SCANNER

Richard W. Rhyins, Ridgefield; Ralph Rand, New Milford; Matthew J. Costello, Bethel, and Robert E. Krallinger, New Milford, all of Conn., assignors to Graphic Sciences, Inc., Canbury, Conn.

Filed Mar. 14, 1975, Ser. No. 558,415
Int. Cl.² H01J *3/14*
U.S. Cl. 250—216 **16 Claims**



1. A folded optical scanner having a relatively bow-free scan line, comprising

a light source,

a focusing lens,

a plane mirror positioned to receive light rays, from said source, which pass through said lens,

a spherical mirror positioned to receive light rays from said plane mirror, said spherical mirror being tilted with respect to a straight-line optical axis between it and said plane mirror, said spherical mirror focusing said rays onto a document being scanned,

said focusing lens and said spherical mirror having opposite optical characteristics so that said rays which focus on said document maintain a flat field at the focus, and

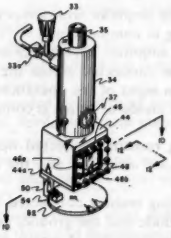
a plane mirror pivoted for rotation about a scan axis and oriented to reflect incident light rays onto said lens along curved paths on the surface of said lens as it pivots on said scan axis.

3,992,624

APPARATUS AND METHOD OF X-RAY TOPOGRAPHY AT CRYOGENIC TEMPERATURE

Robert E. Flannery, Alexandria, and Paul LoVecchio, Reston, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 29, 1975, Ser. No. 572,764
Int. Cl.² G01H *23/20*
U.S. Cl. 250—273 **10 Claims**



1. A method of X-ray topography of a crystal at cryogenic temperatures comprising the steps of:

providing a dewar having a reservoir at the top and a cold finger at the bottom thermally connected to said reservoir upon which an elongated sample crystal mount is attached with said crystal mounted thereon;

providing a sample mount box having an O-ring seal surrounding an opening at the top adapted for rotation of said dewar with respect to said sample mount box and adapted for air tight connection to the bottom of said dewar and having a removable X-ray window on a front side wherein said crystals may be manually moved when said X-ray window is open but is air-tight when connected to said sample mounted box and leg supports rigidly connected thereto on a bottom side that are mounted on a rotatable disc of a Lang camera;

positioning said crystal adjacent said X-ray window and securing said dewar over said O-ring seal on said sample mount box for forming a dewar and sample mount box assembly having an air-tight evacuation chamber when said removable x-ray window is connected on the front side thereof;

providing an X-ray radiation source and a collimating means in line with an X-ray beam from said X-ray radiation source for providing a collimated vertical incident X-ray beam;

rotating said rotatable disc upon which said dewar and sample mount box assembly are mounted for aligning said crystal with said collimated vertical incident X-ray beam;

providing a photographic recording means mounted on said disc in the Bragg reflection mode for recording topographs of the X-ray diffracted radiation from said crystal;

inserting a scattered radiation limiting means between said crystal and said photographic recording means in which said scattered radiation limiting means is perpendicular to said X-ray diffracted radiation for eliminating scattered radiation and spurious reflections emitted from various diffraction planes in said crystal;

applying a vacuum to said evacuation chamber then closing an outlet stem to a vacuum pump for holding the vacuum in said evacuation chamber and removing all leads to said vacuum pump to avoid twisting of said dewar during movement of the Lang camera;

filling said reservoir with a cryogenic liquid until evaporation vibrations cease indicating said crystal is in thermal equilibrium with said reservoir;

translating said dewar and sample mount box assembly and said photographic recording means along a direction parallel to the surface of said crystal wherein said crystal translates across said collimated vertical incident X-ray beam of radiation and whereby said X-ray diffracted radiation emitted from said crystal passes through said scattered radiation limiting means which is stationary with respect to the translating crystal and photographic recording means and is perpendicular to said X-ray diffracted radiation from said crystal wherein said X-ray diffracted radiation is swept across said photographic recording means for exposure thereof during each translation of said crystal;

photographically enlarging the exposures of said photographic recording means for visual observation of the resulting X-ray topographs.

3,992,625

METHOD AND APPARATUS FOR EXTRACTING IONS FROM A PARTIALLY IONIZED PLASMA USING A MAGNETIC FIELD GRADIENT

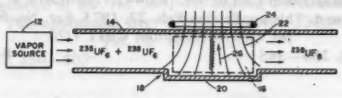
George Schmidt, Teaneck; Gerald M. Halpern, Somerville, and William R. L. Thomas, Holmdel, all of N.J., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Dec. 27, 1973, Ser. No. 428,665
Int. Cl.² H01J *39/34*
U.S. Cl. 250—284 **43 Claims**

42. A method for separating ions from a plasma comprising the steps of:

generating a plasma with a predetermined flow having ionized particles of a predetermined isotope type;

applying a magnetic field to the flowing plasma with a gradient therein in a direction to accelerate the ions of said



plasma substantially in the direction of weaker magnetic field in said gradient; and

orienting said gradient to provide said acceleration in a direction distinct from the plasma flow direction.

3,992,626

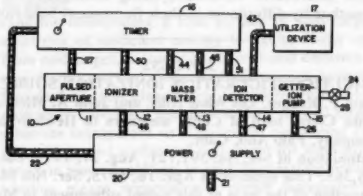
TEST INSTRUMENT

William W. Bursack, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 228,782, Feb. 23, 1973, abandoned, which is a continuation of Ser. No. 751,236, Aug. 8, 1968, abandoned. This application Apr. 26, 1973, Ser. No. 354,707

Int. Cl.² B01D *59/44*

U.S. Cl. 250—288 **1 Claim**



1. A mass spectrometer including means supplying short electrical pulses occurring at intervals which are widely spaced compared to the pulse length,

and means connected thereto for placing the spectrometer in substantially free connection with a gas to be analyzed only during said pulses, and sealing off said connection except during said pulses.

3,992,627

DIAGNOSTIC APPARATUS

Peter Anthony Eabry Stewart, Bristol, England, assignor to Rolls-Royce (1971) Limited, London, England

Continuation of Ser. No. 428,713, Dec. 27, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,279

Claims priority, application United Kingdom, Jan. 6, 1973, 00873/73

Int. Cl.² G01M *23/00*

U.S. Cl. 250—312 **10 Claims**

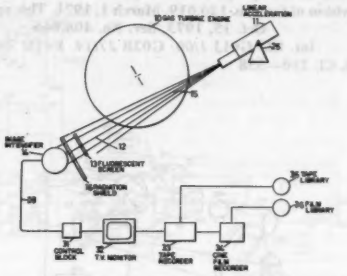
1. Apparatus for obtaining a real-time sequence of images on a television receiver of the movement of the internal parts of an operating rotating turbine engine, comprising:

means for directing radiation in the energy range of 5 – 12 MeV at a selected area of the engine, said radiation having a power greater than 250 rads per minute at a distance of one meter from the source of said radiation,

a fluorescent screen for receiving the radiation transmitted through said engine and producing a fluorescent image,

means for scanning said fluorescent screen at the scanning frequency of said television receiver,

means coupling said scanning means to said television receiver for displaying said fluorescent image, and



a video tape recorder coupled to said television receiver for recording said fluorescent image.

3,992,628

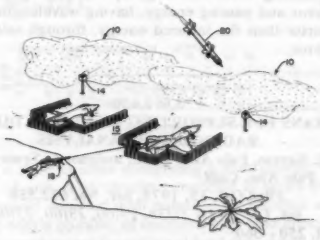
COUNTERMEASURE SYSTEM FOR LASER RADIATION

James L. Karney, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 17, 1972, Ser. No. 271,313

Int. Cl.² G01J *1/00*

U.S. Cl. 250—338 **11 Claims**



1. An effective countermeasure system against laser beam target designators, comprising:

a. an aerosol resonance absorption material having laser energy absorbing and attenuating properties;

b. means for deploying and interposing said aerosol material into the atmosphere in a path between the source of said laser energy and a target and between reflected laser energy from a target and a laser energy seeking guidance device;

c. said aerosol material, when deployed and interposed in the path of laser energy, significantly reducing the laser energy by absorption and attenuation of the laser beam, said laser energy being absorbed by the aerosol material with subsequent redistribution of the energy into any of the vibrational and rotational states and preventing the instantaneous re-emission of the original optical energy of the laser;

d. said aerosol material also reducing the intensity of any reflected incident energy from the target as a result of a second attenuation as any such reflected energy attempts to pass a second time through an absorbing aerosol medium;

e. said aerosol material being non-toxic and providing no visible trace thereof when dispersed into the atmosphere in the paths of laser radiation.

3,992,629

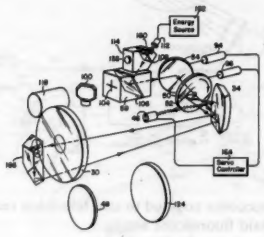
TELESCOPE CLUSTER

Arthur S. Chapman, Rolling Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 120,019, March 1, 1971. This application Oct. 15, 1973, Ser. No. 408,966

Int. Cl.[2] G01J *1/00*; G02B *27/14*; F41G *7/00*

U.S. Cl. 250—338 16 Claims



13. A method in a telescope cluster system having a composite structure with two parallel external faces, a dichroic mirror within the structure, an aperture at the center of the dichroic mirror, an objective lens and a folding mirror optically coupled to said dichroic mirror for receiving infrared radiation, the steps comprising:

a. spinning said structure about a spin axis perpendicular to said external faces; and

b. reflecting infrared energy by means of said dichroic mirror and passing energy, having wavelengths that are shorter than the infrared energy, through said dichroic mirror.

3,992,630

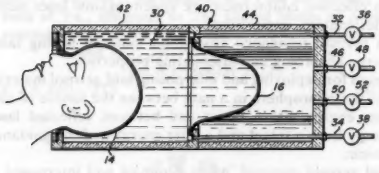
MEANS FOR SUPPORTING AN OBJECT DURING RADIOGRAPHIC ANALYSIS

Josef E. Kercso, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Oct. 15, 1975, Ser. No. 622,558

Int. Cl.[2] G01N *21/34*, *21/00*, *23/00*, *23/04*

U.S. Cl. 250—360 18 Claims



1. Means for supporting an object, or a portion thereof, during radiographic analysis comprising a hollow reservoir adapted to receive and hold a constant volume of fluid material within the interior thereof, said reservoir having a pouch-like flexible member forming all or a portion of one wall portion thereof, said pouch-like flexible member being adapted to receive and support the object undergoing analysis during radiographic exposure thereof, a second flexible member forming all or a portion of a second wall portion thereof, and vacuum means for moving said second flexible member so as to cause a corresponding movement of said pouch-like flexible member.

3,992,631

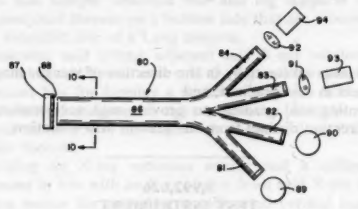
FLUOROMETRIC SYSTEM, METHOD AND TEST ARTICLE

Richard A. Harte, Redwood City, Calif., assignor to International Diagnostic Technology, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 447,574, March 4, 1974, abandoned. This application Feb. 27, 1975, Ser. No. 553,582

Int. Cl.[2] A61K *39/00*; G01T *1/20*

U.S. Cl. 250—365 8 Claims



1. In a body adapted to enable fluorometric detection and determination of at least two different sample substances, first and second sample substances carried by a surface of said body in immobilized form and in random dispersion, each sample substance being immunologically bound to a prelabelled fluorescent substance selectively reactive with it, respective fluorescent substances being distinguishable from one another by differences in their fluorescent behavior.

3,992,632

MULTICONFIGURATION IONIZATION SOURCE

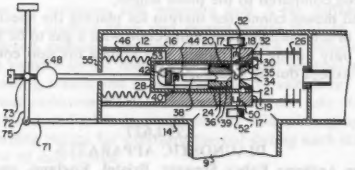
William P. Kruger, Los Altos Hills, and John A. Michnowicz, Santa Clara, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 391,721, Aug. 27, 1973, Pat. No. 3,886,365. This application Apr. 16, 1975, Ser. No. 568,499

The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.

Int. Cl.[2] H01B *39/34*

U.S. Cl. 250—423 R 2 Claims



1. A multiconfiguration multimode ionization source comprising:

a vacuum tight envelope;

means mounted within said envelope and defining a chamber having a plurality of openings;

electron source means disposed exterior to the chamber for supplying electrons to the chamber, through a first of said openings;

sample inlet means for supplying a gaseous sample through a second of said openings for reaction with the electrons inside the chamber to create ions, said ions exiting through a third of said openings; and

aperture control means for changing the size of said first and third openings to change the pressure in the chamber, thereby to change the operating mode of the source from a first to a second ionization mode.

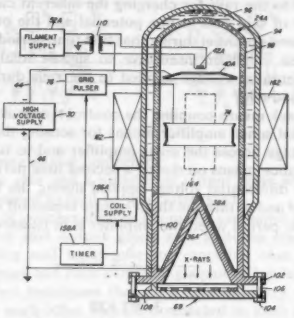
3,992,633
BROAD APERTURE X-RAY GENERATOR

Martin Braun, and Howard D. Doolittle, both of Stamford, Conn., assignors to The Machlett Laboratories, Incorporated, Springdale, Conn.

Continuation of Ser. No. 393,771, Sept. 4, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 530,793

Int. Cl.² H01J *35/16*

U.S. Cl. 250—503 **3 Claims**



1. An X-ray generator comprising:

a transmissive target having a width many times greater than its depth;

means for illuminating a first surface of said target with electrons of sufficient energy to excite X-ray emission from said target, at least a portion of said emission occurring from a second surface of said target opposite said first surface, said illuminating means being structured to uniformly illuminate said first surface of said target;

a substrate transparent to X-radiation positioned contiguous said second surface of said target for supporting said target in spaced relation to said illuminating means; and window means comprising a region transparent to x-radiation bounded by a housing opaque to X-radiation, said window means being positioned relative to said second surface of said target and oriented thereto at an angle of approximately 80° to 85° for passing radiation emitted from said second surface of said target in a direction approximately 80° to 85° relative to a normal of said second surface, said housing of said window means being positioned relative to said target for inhibiting the passage of X-radiation emitted at an angle outside the range of approximately 80° to 85° relative to a normal of said second surface of said target, thereby providing a higher percentage of fluorescent X-ray lines relative to the entire spectrum of the emitted X-radiation.

3,992,634
TOUCH ACTUATED ELECTRONIC SWITCH INCLUDING PROTECTION FROM HIGH POTENTIAL ELECTRICITY

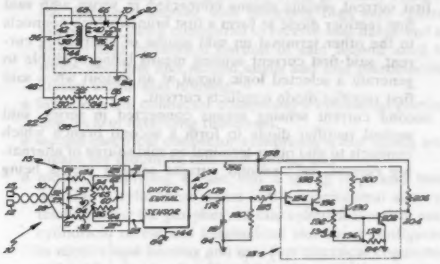
Willis A. Larson, Mequon, Wis., assignor to Magic Dot, Inc., Minneapolis, Minn.

Filed May 9, 1975, Ser. No. 576,228

Int. Cl.² H03K *13/00*

U.S. Cl. 307—116 **35 Claims**

1. A touch actuated electronic switch, including protection from high potential electricity, comprising in combination: sensing means including signal input means and including signal output means for providing an output signal related to an input signal received; a touch surface; resistance means having first and second ends; capacitance means having first and second ends; means for providing an electrical connection between the touch surface and the first end of the resistance means; means for providing an electrical connection between the first end of the resistance means and the first end of the capacitance means; means for providing an electrical connection between the second end of the capacitance means and ground; means for providing an electrical connection between



the second end of the resistance means and the signal input means of the sensing means; means for receiving an alternating voltage; means for providing an electrical connection between the receiving means and the sensing means.

3,992,635
N SCALE COUNTER

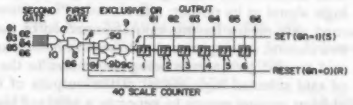
Yasoji Suzuki, Ayase; Kenshi Manabe, Yokohama; Teruaki Tanaka, Yokohama, and Tomohisa Shigematsu, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 17, 1975, Ser. No. 632,575

Claims priority, application Japan, Nov. 18, 1974, 49-132092

Int. Cl.² H03K *21/02, 23/30*

U.S. Cl. 307—225 C **8 Claims**



1. An n scale counter comprising a shift register having a plurality of unit delay circuits connected in series which are synchronously supplied with pulses to be counted and each provided with a plurality of insulated gate field effect transistors, a set-reset means for setting at least one of said unit delay circuits and resetting the remaining unit delay circuits to set said shift register into the initial state, and a closed loop circuit receiving output signals from the last stage unit delay circuit of said shift register and a selected one of the remaining unit delay circuits and applying to the first stage unit delay circuit an output signal which causes the first stage unit delay circuit to produce an output signal inverted when an output signal of the last stage unit delay circuit is 0 and an output signal which causes the first stage unit delay circuit to produce an output signal non-inverted when an output signal of the last stage unit delay circuit is 1.

3,992,636
DIGITAL INPUT CIRCUIT WITH FAULT DETECTION MEANS

William W. Kiffmeyer, Bayside, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed Feb. 5, 1976, Ser. No. 655,456

Int. Cl.² H03K *5/20, 19/14*

U.S. Cl. 307—231 **6 Claims**

1. In an input circuit for indicating the state of a sensing device, the combination comprising:

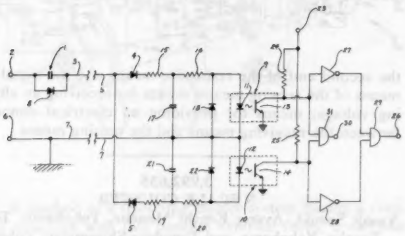
a diode connected in shunt with said sensing device and having one lead connected to one terminal of an alternating current source;

a first rectifier diode having its anode coupled to the other lead on said shunt diode;

a second rectifier diode having its cathode coupled to said other lead on said shunt diode;

first current sensing means connected in series with said first rectifier diode to form a first branch which connects to the other terminal on said source of alternating current, said first current sensing means being operable to generate a selected logic signal at an output when said first rectifier diode conducts current;

second current sensing means connected in series, said second rectifier diode to form a second branch which connects to said other terminal on said source of alternating current, said second current sensing means being



operable to generate a selected logic signal at its output when said second rectifier diode conducts current;

first gate means having inputs connected to the respective current sensing means outputs and having an output terminal, said first gate means being responsive to the presence of said selected logic signal at the outputs of both said current sensing means to generate a selected logic signal at its output; and

second gate means having inputs connected to the respective current sensing means outputs and having an output, said second gate means being responsive to the absence of said selected logic signal at the outputs of both said current sensing means to generate a selected logic signal at its output.

3,992,637

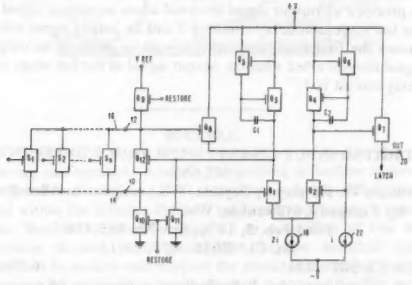
UNCLOCKED SENSE AMPLLIFIER

Bruce M. Cassidy, Lexington, Ky., and Raymond S. Hockedy, Underhill, Vt., assignors to IBM Corporation, Armonk, N.Y.

Filed May 21, 1975, Ser. No. 579,354

Int. Cl.² H03K *5/20*; **G11C** *11/40*, *7/06*

U.S. Cl. 307—235 F **7 Claims**



1. A memory sense amplifier for sensing a differential signal across a double rail memory system with inherent rail capacitance;

a differential sense amplifier means with one input coupled to one of the rails of the memory system and the other input coupled to the other rail of the double rail input system,

shunt balance means coupled between the two rails for reducing the potential difference between the two rails while it is on, said shunt balance means having a control terminal to turn said shunt balance means on and off,

restore means coupled to the control terminal to maintain said shunt balance means off during a first time period and to the rails for charging the inherent capacitance of one of said rails to one potential and the other rail to a second potential during that first time period to make the sense amplifier insensitive to signals smaller than the differential voltage applied to the rails during that first period and,

feedback means coupling the control terminal to the differential sense amplifier means for sensing the differential voltage across the sense amplifier and to turn the shunt balance means on during a second time period to reduce the differential voltage applied during the first time period and to turn the shunt restore means off during a third time period when the amplifier is in balance.

3,992,638

SYNCHRONOUS SWITCH

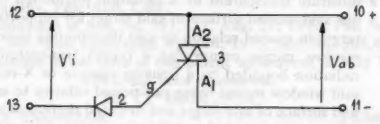
Maurice Sauvanet, Fontenay-Le-Fleury, France, assignor to Silec-Semi-Conducteurs, Paris, France

Filed Feb. 22, 1974, Ser. No. 445,033

Claims priority, application France, Mar. 1, 1973, 73.07376

Int. Cl.² H03K *17/72*

U.S. Cl. 307—252 B **8 Claims**



1. An electrical circuit for closing or opening an AC load circuit when the voltage in the load circuit approaches zero immediately following the application of a control voltage from a control voltage source to said electrical circuit, the operation of said electrical circuit being insensitive to the characteristic of said load circuit, said electrical circuit comprising;

a triac having a first main electrode A_2, a second main electrode A_1 and a control electrode,

rectifying means connected across said first main electrode A_2 and said second main electrode A_1 and connected to said AC load circuit for applying a rectified voltage, the interruption of which is to be controlled, across said first and second main electrodes of said triac,

at least one diode, said diode being connected in a series circuit with said control voltage source, said first main electrode and said control electrode of said triac, said diode being polarized so that the current that would flow through said triac from said control source and the current that would flow through said triac from said rectifying means when said triac is conducting have the same direction of current flow, whereby said triac can be triggered only close to a zero crossing of the voltage in said load circuit.

3,992,639

SCANNING DEVICE

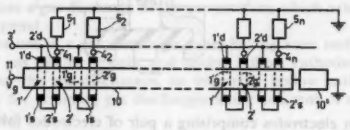
Trevor Lionel Tansley, Hempshill Vale, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 13, 1975, Ser. No. 577,112

Claims priority, application United Kingdom, May 29, 1974, 23860/74

Int. Cl.²H03K *3/353;* **H03K** *17/60;* **G11C** *27/00;* **H01L** *29/78*

U.S. Cl. 307—304 **6 Claims**



1. A scanning device comprising:

a. an input gate and a number of output gates which are each destined to feed an associated load;

b. a series of switches disposed between said input gate and respective said output gates, said switches electrically connecting said input gate to respective ones of said output gates and each comprising a pair of insulated gate field effect transistors that are complementary with respect to each other and are connected to each other in series arrangement between said input gate and their associated output gate, said complementary transistors comprising respective gate electrodes; and

c. a resistance element electrically connecting said gate electrodes together via connection of each of said gate electrodes in each of said complementary transistor pairs to different pairs of position points along said resistance element such that potential differences can be applied mutually between said gate electrodes of the field effect transistors by applying a potential gradient across the resistance element.

3,992,640

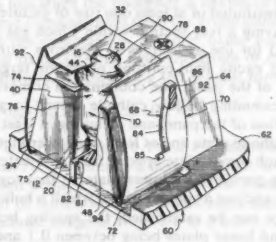
PIEZO CRYSTAL HOUSING AND MOUNT

Robert F. O'Brien, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 29, 1974, Ser. No. 528,528

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.7 **2 Claims**



1. A piezoelectric crystal device comprising:

a first anvil having a frustro-conical portion and a cylindrical portion;

a second anvil having a flange and a cylindrical portion, said flange having a larger outer diameter than said cylindrical portion;

a piezoelectric crystal;

a housing comprising a frustro-conical portion, a center portion and a closing portion, said frustro-conical portion defining a central opening and being configured to receive said frustro-conical portion of said first anvil with at least a portion of said first anvil extending through said central opening, said center portion being generally cylindrical and being configured to receive said cylindrical portion of said first anvil and to receive said piezoelectric crystal, and said closing portion being generally cylindrical, having a smaller wall thickness than said central portion and being configured to receive said flange and to engage said cylindrical portion of said second anvil to retain said first and second anvils and said piezoelectric crystal within said housing;

a first electrical connector comprising a cylindrical portion and an arm extending therefrom;

a second electrical connector comprising a leaf spring and means for mounting said leaf spring; and

a mount comprising a base and a spring clip, said base defining a cylindrical recess and a longitudinal slot extending along the periphery of said cylindrical recess, said cylindrical recess and longitudinal slot being configured to receive said housing and said first electrical connector with said arm extending through said longitudinal slot and with said cylindrical portion of said first connector in contact with said second anvil, and said spring clip being electrically conductive and comprising a flat wall and a pair of spring walls extending from said flat wall, each spring wall terminating in a retaining clip, said flat wall defining a central opening axially aligned with said cylindrical recess through which a portion of said first anvil extends while in contact with said flat wall, and said retaining clips releasably engaging said base with said housing and first electrical connector retained within said cylindrical recess and with said spring clip in contact with said leaf spring.

3,992,641

POLYPHASE DISC RELUCTANCE MOTOR

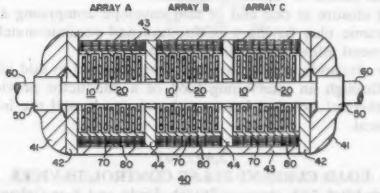
Theodore M. Heinrich, Murrysville, and Suresh K. Bhate, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 22, 1974, Ser. No. 526,289

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² H02K *17/42*

U.S. Cl. 310—168 **12 Claims**



1. A polyphase variable reluctance dynamoelectric machine comprising:

a frame;

a shaft mounted for rotation within said frame;

a group of *K* rotor-stator arrays supported in tandem within said frame, *K* being a positive integer greater than 2, said group comprising a first array, a last array, and an array intermediate of said first and last arrays;

each of said rotor-stator arrays comprising one or more axially spaced stator discs secured to said frame and one or more axially spaced rotor discs secured to said shaft, said rotor and stator discs being arranged in interleaved relation one with another and spaced apart to define an axial air gap therebetween;

each of said rotor and stator discs comprising a plurality of magnetic and non-magnetic segments, a non-magnetic segment being disposed intermediate of two of said mag-

netic segments, said magnetic and non-magnetic segments having a pitch of ρ mechanical radians;

corresponding magnetic segments of adjacent stator discs being disposed in alignment with each other within each array and in alignment with corresponding magnetic segments of said stator discs contained within adjacent arrays; and

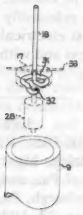
corresponding magnetic segments of adjacent rotor discs being disposed in alignment with each other within each array, the magnetic segments of said rotor discs contained within the N^{th} array being angularly displaced by $(N-1)\text{-}(2/K)\rho$ mechanical radians with respect to corresponding magnetic segments of the rotor discs contained within said first array, N being a positive integer from the set of integers $(1,2, \ldots, K)$, $N=1$ referring to said first array and $N=K$ referring to said last array.

3,992,642

CERAMIC ENVELOPE PLUG AND LEAD WIRE AND SEAL

Charles I. McVey, 3316 Ardmore Road, Shaker Heights, Ohio 44120, and Robert L. Kelling, 7473 Hughes Road, Ravenna, Ohio 44266

Filed Dec. 15, 1975, Ser. No. 640,805
Int. Cl.² H01J 61/52
U.S. Cl. 313—43 **6 Claims**



1. A high pressure sodium vapor lamp comprising:

a tubular light-transmitting ceramic envelope having end closures and thermionic electrodes sealed into its ends and containing inert starting gas and a charge including an excess of vaporizable metal;

the closure at one end of said envelope comprising a ceramic plug having a perforation and ceramic-matching metal inlead wire sealed therethrough;

the electrode at said one end being attached to said inlead through an intervening loop of a conductor providing thermal isolation between the electrode and the inlead seal.

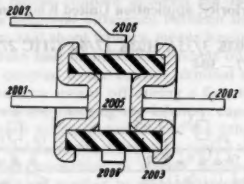
3,992,643

LOAD CURRENT PULSE CONTROL DEVICES

Zoltan Vital, 353, chaussee St. Job, Uccle, and Jean Orban, 11, avenue des Mesanges, Clabecq, both of Belgium

Division of Ser. No. 275,886, July 27, 1972, Pat. No. 3,818,266, which is a division of Ser. No. 244,279, Apr. 14, 1972, which is a continuation of Ser. No. 799,554, Feb. 13, 1969, abandoned. This application Aug. 17, 1973, Ser. No. 389,200
Claims priority, application Belgium, Feb. 13, 1968, 54471; Nov. 21, 1968, 66425; Dec. 27, 1968, 68017; Jan. 20, 1969, 68982
Int. Cl.² A47B 53/00
U.S. Cl. 313—198 **6 Claims**

1. A gas-filled switching tube for use with a photographic flash tube of an electronic flash device for providing a low impedance current path to enable control of current flow through the flash tube, comprising a hollow enclosure having a length substantially the same as the width thereof, two unpolarized main electrodes disposed within the enclosure along with a mass of gas filling the enclosure, the gas and its pressure and the location and form of the electrodes permitting an arc discharge current to flow between, and completely outside said electrodes, firing electrode means disposed around the exterior wall of said enclosure for triggering the flow of such arc discharge current between said main electrodes, and said



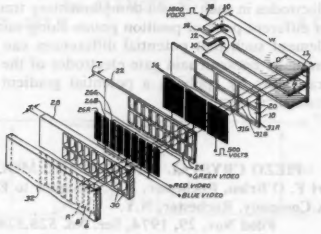
main electrodes comprising a pair of electrodes forming opposed large electrode surfaces within said enclosure, the spacing between said surfaces being smaller than the spacing across the internal surface of said enclosure.

3,992,644

CATHODOLUMINESCENT DISPLAY WITH HOLLOW CATHODES

Gerald J. Chodil, Highland Park; Michael C. DeJule, Chicago, both of Ill., and David Glaser, Greenbrook, N.J., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed June 20, 1975, Ser. No. 588,737
Int. Cl.² H01J 61/06
U.S. Cl. 313—217 **25 Claims**



1. For use in a low pressure gas discharge panel for displaying images constituted of at least one row of picture elements, said panel having a rear section within which gas discharges are generated for use as sources of electrons with which to bombard and excite light-emitting phosphor targets near a front section of the panel, the combination comprising:

row-wise extending hollow cathode means located in the rear section of the panel and including at least one upper metal cathode plate and at least one lower metal cathode plate, each upper plate spaced from and extending substantially parallel to a lower plate so that together they partially enclose a volume within which a hollow cathode discharge can be established, the spacing between said upper and lower plates being between 0.1 and 3.0 times the length of the cathode fall of a planar cathode of the same metal operating in an atmosphere of the same gas and at the same pressure, said plates extending toward the front of the panel a distance which is at least as great as the spacing between the plates and having a width at least as great as the spacing between the plates;

first electron-transmissive grid means situated forward of said hollow cathode means and adapted to receive a first energizing potential for extracting electrons from a hollow cathode discharge established within the volume partially enclosed by said cathode plates;

second electron-transmissive grid means situated forward of said first grid means and adapted to receive a second

energizing potential for controlling the flow of electrons through said first and second grid means;

a faceplate in the front section of the panel having a phosphor coating thereon which emits light when struck by electrons, said faceplate adapted to receive a third energizing potential for accelerating toward the phosphor coating those electrons which pass through said second grid means, the faceplate and the second grid means being spaced apart by a distance which is too small to sustain a gas discharge at the gas pressure which exists in the panel.

23. For use in a gas discharge panel having rows and columns of gas discharge cells and having hollow cathodes for generating the gas discharges, an improved hollow cathode structure for scanning gas discharges along columns of cells, comprising:

at least one lower cathode plate extending row-wise in the panel and adapted to receive an energizing potential;

a plurality of smaller cathode plates situated substantially adjacent to each other in a row-wise plane above and substantially parallel to said lower cathode plate, each of said smaller cathode plates adapted to sequentially receive said energizing potential to excite a hollow cathode discharge in the volume partially enclosed by the lower cathode plate and the upper smaller energized plate, which discharge propagates along the row as each smaller cathode plate is successively energized; and

an electrode situated within the volume partially enclosed by said cathode plates and adapted to receive a voltage for drawing electrons to itself from any residual plasma remaining in a turned off hollow cathode area.

3,992,645

MAGNESIUM ALUMINATE GALLATE PHOSPHORS AND REPROGRAPHIC LAMP CONTAINING SAME

Edward E. Kaduk, Lyndhurst, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 592,789, July 2, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 668,869

Int. Cl.² C09K *11/30;* **H01J** *61/35*

U.S. Cl. 313—486 **7 Claims**

1. An improved magnesium aluminate gallate phosphor composition activated with manganese which further contains a minor proportion of stabilizer additive M_w incorporated as a constituent therein by including same in the starting materials for preparation of the phosphor composition to avoid brightness loss when the phosphor is heated in air, said stabilizer additive being selected from the group consisting of boric oxide and the combination of boric oxide with an alkaline earth metal oxide selected from the group of calcium, strontium and barium oxides having the general formula:

$$Mg_x\ Al_{2y}\ Ga_{2(1-y)}\ O_{3+x+2y+w}:\ Mn_z,\ M_w$$

wherein x is between about 0.1 and 1.2, wherein y is between about 0.1 and 0.7, wherein z is between about .01 and 0.1, and w is between about 1×10^{-4} and 3×10^{-2} and wherein the molar ratio of boric oxide to alkaline earth metal oxide is in the approximate range of from 1:1 to 1.6:1.

3,992,646

PLANT GROWTH TYPE FLUORESCENT LAMP

Richard Corth, Nutley, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 4, 1972, Ser. No. 277,942

Int. Cl.² H01J *61/44*

U.S. Cl. 313—487 **5 Claims**

1. A luminescent discharge lamp to efficiently stimulate balanced plant growth, said lamp comprising a light transmitting envelope, phosphor means as the primary light-generating media coated on the interior surface of said envelope, and means for producing an electrical discharge within said envelope to energize said phosphor means to a light-generating condition, said phosphor means when energized exhibiting a predetermined emission spectrum, and the combined emission of said phosphor means and said discharge which passes

through said envelop having a spectral energy distribution such that the energies in the 400–500 nm, 590–640 nm, 640–690 nm, and 690–800 nm bands are at least within about 15% of being within the proportions of 0.8:1:1:1.

3,992,647

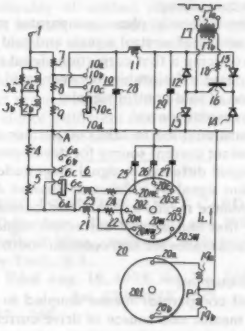
SYSTEM FOR BEAM LANDING CORRECTION IN COLOR CATHODE RAY TUBE IN THE EARTH'S MAGNETIC FIELD

Mitsuyoshi Yamada; Hideo Hatada, both of Tokyo; Masato Izumisawa, Yokosuka; Hiromasa Machida, Mitaka, and Norihide Furuyama, Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,625

Int. Cl.² H01J *29/76*

U.S. Cl. 315—379 **5 Claims**



1. A system for dynamic beam landing correction in color cathode ray tubes having deflection means for producing horizontal and vertical electron beam deflection fields, said system comprising:

a. additional deflection means including coil means provided on the color cathode ray tube for producing a magnetic electron beam deflection field in addition to the horizontal and vertical electron beam deflection fields so as to compensate for mislanding of the electron beam occuring on a screen of the color cathode ray tube;

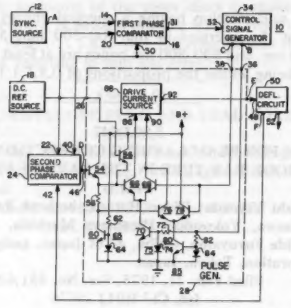
b. circuit means connected to said deflection means for generating a periodically varying current of a predetermined wave form to compensate for the beam mislanding, said circuit means being connected to said additional deflection means to supply the current to said coil means; and

c. control means connected with said circuit means for changing the circuit means to change the wave form of said current supplied to said coil means in accordance with to the direction to which said color cathode ray tube faces.

3,992,648
DRIVE PULSE GENERATOR FOR A TELEVISION DEFLECTION CIRCUIT

Leslie Ronald Avery, Lightwater, England, assignor to RCA Corporation, New York, N.Y.

Filed May 22, 1975, Ser. No. 579,991
Claims priority, application United Kingdom, Feb. 11, 1975, 46962/75
Int. Cl.[2] H01J *29/70, 29/72*
U.S. Cl. 315—387 **6 Claims**



1. A generator for supplying constant width drive pulses to a television deflection circuit to enable the development of deflection signals comprising:

a source of control signals; phase comparator means coupled to said source of control signals and said deflection circuit for producing a first correction signal representative of the phase relationship between said deflection signal and one of said control signals;

first command current source;

impedance means coupled to said comparator means and said first constant current source for developing a second correction signal differing in signal magnitude from said first correction signal by a constant amount determined by said impedance means and said first constant current source, said first and second correction signals thereby establishing references for said constant width drive pulse generation;

source of drive current;

first signal level comparator means coupled to said phase comparator means, said source of drive current and said source of control signals for initiating the production of drive current by said source of drive current when a first predetermined relationship exists between said control signals and said first correction signal; and

second signal level comparator means coupled to said first constant current source, said source of drive current and said source of control signals for terminating the production of drive current by said source of drive current when a second predetermined relationship exists between said control signals and said second correction signal.

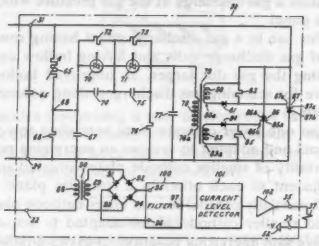
3,992,649
CURRENT DIFFERENTIAL FAULT DETECTION CIRCUIT

William C. Kotheimer, Lansdowne, and Stanley B. Wilkinson, Havertown, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Feb. 10, 1975, Ser. No. 548,849
Int. Cl.[2] H02H *7/22, 3/38*
U.S. Cl. 317—26 **19 Claims**

1. A differential protective circuit for detecting the occurrence of a fault within a portion of an a-c electric power system, said system including a plurality of separate conductors through which current flows into and out of said portion and a plurality of main current transformers, having secondary windings connected in parallel with one another, the voltage across the paralleled secondary windings being less than a predetermined magnitude in the absence of a fault in the protected portion of the power system, said circuit comprising:

a. first circuit means for generating an output signal in response to fault current above a predetermined minimum magnitude,



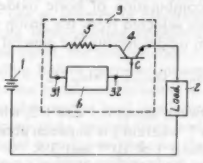
b. normally open switching means for connecting said first circuit means in parallel with the paralleled secondary windings of said main current transformers, and

c. second circuit means responsive to the voltage across the paralleled secondary windings for actuating said switching means to closed position when the instantaneous voltage across said secondary windings attains a predetermined minimum magnitude, whereby fault voltage across said secondary windings connects said first circuit means for response to differential fault current in said secondary windings.

3,992,650
APPARATUS TO PREVENT OVERCURRENT OR OVERVOLTAGE

Hitoo Iwasa, Takatsuki, and Gota Kano, Nagaoka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jan. 29, 1975, Ser. No. 545,165
Claims priority, application Japan, Feb. 4, 1974, 49-14807
Int. Cl.[2] H02H *3/08*
U.S. Cl. 317—33 R **7 Claims**



1. An apparatus for disconnecting a power source from a load in the event of overcurrent in the load or overvoltage of the source, comprising:

a switching element having an electrode for controlling the passage of current through the element in response to the level of voltage applied to said electrode;

voltage detection means connected in series with said switching element and the voltage source;

a negative resistance device comprising a complementary connection of an n-channel field-effect transistor and a p-channel field-effect transistor, said device being connected at one end to said control electrode and at the other end to an end of the voltage detection means opposite that which is connected to said switching element,

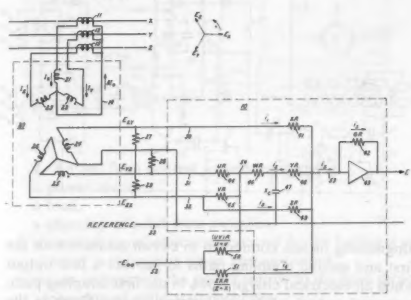
said device being operative in response to voltage thereacross to supply voltage to said control electrode.

3,992,651

ACTIVE SYMMETRICAL COMPONENT NETWORK FOR PROTECTIVE RELAYS

Merwyn E. Hodges, Broomall, Pa., assignor to General Electric Company, Phila, Pa.

Filed Apr. 1, 1975, Ser. No. 564,015
Int. Cl.² H02H *3/26*
U.S. Cl. 317—47 **15 Claims**



1. A sequence sensitive circuit responsive to phase signals in three phase vectorial relation, said three phase signals being fully represented as the sum of balanced three phase positive sequence components and balanced three phase negative sequence components, said circuit generating an output current signal proportional to said components of one sequence but not to said components of the other sequence, which comprises:

a. first circuit means responsive to a first of said phase signals for generating a first current signal having a desired proportion to and in phase with said first phase signal;

b. second circuit means responsive to the second and third phase signals for generating a second current signal, said second current signal having a first current component having said desired proportion to 1.155 times the amplitude of the second phase signal and having a phase lag of 30° from said second phase signal, and a second current component having said desired proportion to 0.577 times the amplitude of the third phase signal and having a phase lag of 30° from said third phase signal and

c. third circuit means responsive to the first and second generated current signals for generating an output signal current proportional to the sum of said first and second generated current signals.

3,992,652

BULK ELECTRICAL SURGE ARRESTER

Leonard L. Blaisdell, Medway, and Normand E. Tetreault, Foxboro, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sept. 9, 1974, Ser. No. 504,547
Int. Cl.² H02H *3/22*; **H05K** *7/04*
U.S. Cl. 317—61.5 **9 Claims**

1. A bulk electrical surge arrester comprising

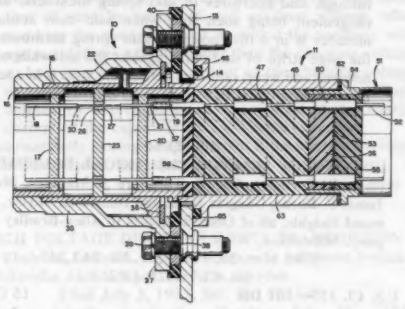
a housing member;

closure members mounted at opposite ends of said housing member forming therewith an enclosed chamber;

a plurality of conductive leads electrically insulated from each other and lying generally parallel to each other, said conductive leads each having an interior portion disposed within said chamber, a first exterior portion extending through one of said closure members to the exterior of said chamber, and a second exterior portion extending through the other of said closure members to the exterior of said chamber;

a conductive ground plane member mounted within said chamber generally transverse to the conductive leads;

each of said conductive leads passing through a different opening in said ground plane member and being spaced therefrom by insulating material whereby a spark gap is formed between each of said conductive leads and the ground plane member;



a like plurality of resistive elements mounted fixed with respect to each other, each having one end in electrical connection with the second exterior portion of a different one of said conductive leads;

a like plurality of contact members mounted fixed with respect to each other and electrically insulated from each other, each of said contact members having contact surfaces at one end; and

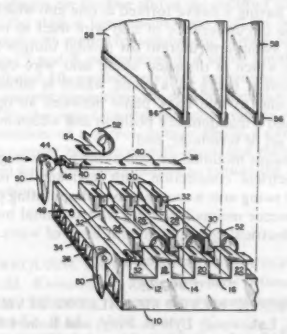
a like plurality of low pass filter means mounted fixed with respect to each other, each being connected between the other end of a different one of said resistive elements and a different one of said contact members.

3,992,653

ZERO INSERTION FORCE CARD GUIDE

Paul H. Richardson, Bloomington, and William S. Theros, Eagan, both of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,359
Int. Cl.² H05K *7/20*
U.S. Cl. 317—100 **7 Claims**



1. In a electronic module in which electrical components are mounted on printed circuit cards in contact with thermally conductive strips on said cards, said strips being connected to a thermally conductive edge strip, an improved heat exchanger comprising:

a. a block of thermally conductive material having a plurality of spaced apart parallel notches formed on one surface thereof adapted to loosely receive the edge strips of said printed circuit cards and a plurality of parallel slits formed between said notches;

b. a plurality of arcuate spring members having a tab at one end inserted in said slits and an aperture at the other end;

c. a cam actuatable member movably mounted on said block having a plurality of projections extending therefrom at spaced intervals such that said projections pass through said apertures in said spring members, the arrangement being such that when said cam actuatable member is in a first position, said spring members urge the edge strips of said cards against the sidewalls of said notches and when said cam actuatable strip is in a second position said cards fit loosely in said notches.

3,992,654

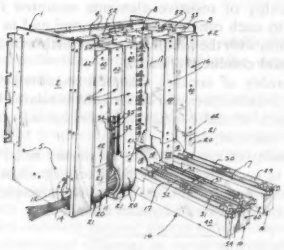
DISCONNECT ARM FOR ELECTRICAL EQUIPMENT

William B. Springer, Euclid; Theodore J. Markley, Mentor; James F. Burns, Chagrin Falls, and Donald E. Taylor, Richmond Heights, all of Ohio, assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Mar. 26, 1975, Ser. No. 562,247

Int. Cl.² H02B *1/02*

U.S. Cl. 317—101 DH **15 Claims**



1. In an electrical connector for removably connecting a plurality of wires to a set of terminals which are supported by a frame and are positioned within a back plane, the combination comprising:

a wire duct mounted to said frame and having a substantially circular cylindrical shape;

a swing arm having a sleeve formed at one end which wraps around the circumference of said wire duct to rotatably fasten the swing arm thereto for pivotal motion about a pivot axis which is disposed along said wire duct, said pivotal motion being in a plane which is substantially perpendicular to said back plane between an operating position and a maintenance position and which intersects with said set of terminals; and

connector means mounted on said swing arm to engage and make electrical connection with said set of terminals when said swing arm is swung into said operating position, said connector means including wire terminal means for making electrical connection with a set of wires.

3,992,655

ELECTRONIC METER SIGNALLING DEVICE

Jack E. Olson, Lakewood; Lyle D. Frey, and Robert S. Nevin, both of Denver, all of Colo., assignors to Dieterich Standard Corporation, Boulder, Colo.

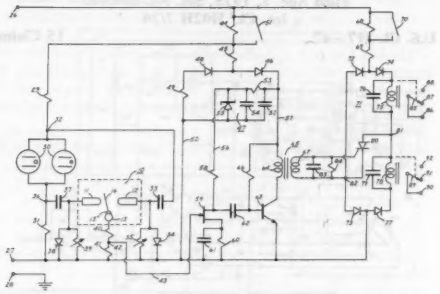
Filed Sept. 16, 1974, Ser. No. 506,508

Int. Cl.² H01H *47/00*

U.S. Cl. 317—123 **8 Claims**

1. A meter signal for use with an instrument having a pivotally mounted meter vane exhibiting electrical properties, comprising:

capacitive coupling means operatively connected to the instrument and positioned with respect to the pivot of the meter vane to form first and second separate and discrete capacitive coupling paths for transmission of electrical charge flow when formed including said vane at selected positions thereof; and,



distinguishing means connected in circuit relation with the first and second coupling paths to provide a first output when an electrical charge flows in the first coupling path, a second output when an electrical charge flows in the second coupling path, and a third output when no significant electrical charge flows in either the first or second coupling paths.

3,992,656

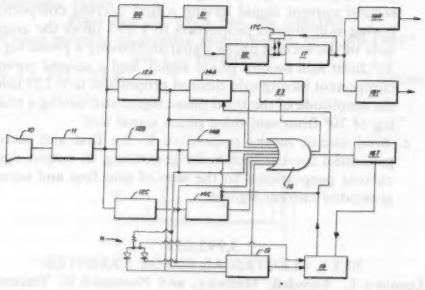
SIREN DETECTOR

Ivan L. Joy, 415 Delaware Drive, Ozawkie, Kans. 66070

Filed Sept. 11, 1975, Ser. No. 612,355

Int. Cl.² G08G *1/04*

U.S. Cl. 317—147 **8 Claims**



1. An audio range siren detector comprising

audio pick-up means for transducing variable frequency audio signal energy into variable frequency electrical signal energy,

narrow band signal producing means responsive to said audio pick-up means to produce separate outputs when predetermined closely spaced fundamental siren frequencies appear in said electrical signal energy,

gated control means responsive to the signal producing means only upon pre-determined reduction of outputs therefrom within a limited time following initiation of any such output, and

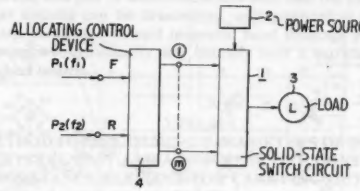
utilization means responsive to said gated control means.

3,992,657

AC FEED CONTROL SYSTEM

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1974, Ser. No. 533,293
Claims priority, application Japan, Dec. 28, 1973, 49-4055
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 5 Claims



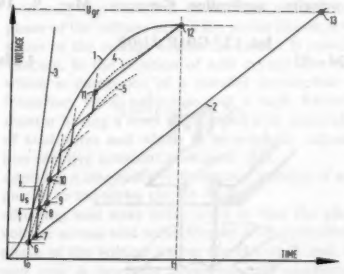
1. An AC feed control system comprising:
a power source,
a load,
a plurality of solid state switches,
a conduct signal allocating control device having a progress input, a retrogress input and an output,
means connecting the power source to the load through the plurality of solid state switches,
means connecting the output of the conduct signal allocating control device to the plurality of solid state switches to control the plurality of solid state switches,
means for generating a progress signal and a retrogress signal,
means for connecting the progress signal to the progess input and the retrogress signal to the retrogress input to control the transition of state of the conduct signal allocating control device to control the increase and decrease rate for the load.

3,992,658

METHOD FOR CHARGING STORAGE CELLS OR STORAGE BATTERIES

Leander Bechtold, Umkirch, and Günther Kartscher, Buchheim, both of Germany, assignors to Pro Casa-Gesellschaft, REG. TRUST, Vaduz, Liechtenstein

Filed June 24, 1975, Ser. No. 589,753
Claims priority, application Germany, June 26, 1974, 2430684; Jan. 28, 1975, 2503331
Int. Cl.² H02J 7/04
U.S. Cl. 320—20 2 Claims



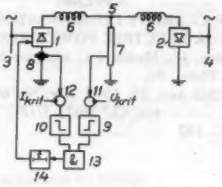
1. A method for charging storage devices constituting storage cells or storage batteries, with a charger and by automatically switching the charger off or over to trickle charge when full charge is reached, comprising the steps of
automatically determining the shape of a charging voltage curve as a function of time after reaching a gassing voltage of the storage device to be charged, and switching the charging current at least over to trickle charge as soon as the increase of the charging voltage approaches zero in the course of time, the method including
providing an auxiliary voltage by charging a capacitor with a charge current,
automatically varying the charge current within pre-set limits and automatically simulating the shape of said charging voltage curve of said storage device as a function of time by means of said auxiliary voltage, after reaching the gassing voltage, such that the auxiliary voltage is a definite extent smaller than the charging voltage as long as a difference quotient of the charging voltage exceeds the difference quotient of the capacitor voltage defined by a predetermined lower limit of the charge current of the capacitor after the same time, and
automatically cutting off the charger if the charging voltage at most equals the capacitor voltage.

3,992,659

HIGH VOLTAGE DIRECT CURRENT TRANSMISSION

Ake Ekstrom, Ludvika, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed July 3, 1975, Ser. No. 593,049
Claims priority, application Sweden, July 19, 1974, 7409437
Int. Cl.² H02M 5/45
U.S. Cl. 321—2 3 Claims



1. High-voltage direct current transmission comprising a rectifier station and an inverter station (1 and 2, respectively), each connected to an AC network (3 and 4, respectively) and connected together by a DC line (5), in which in order to limit overvoltages on the line and in the rectifier station upon starting of the station towards an open line, the rectifier station is provided with means for sensing the voltage and current of the station (7 and 8, respectively), a signal emitter, level indicators (9 and 10, respectively) for maximum voltage and minimum current connecting the sensing means to the signal emitter (13), the signal emitter including means responsive to the combination of a direct voltage above a certain level and a direct current below a certain level, and means responsive to a signal from the signal emitter to reduce the direct voltage of the station.

3,992,660

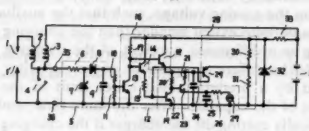
FREQUENCY-CURRENT CONVERSION CIRCUIT

Yoshichi Kawashima, Gifu; Hiroiku Masuda, Aichi, and Hisami Mitsueda, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Aichi, Japan

Filed Jan. 17, 1975, Ser. No. 542,002
Claims priority, application Japan, Jan. 18, 1974, 49-8715
Int. Cl.² H03B 3/04; H02M 7/00
U.S. Cl. 321—6 7 Claims

1. A frequency-current conversion circuit comprising:
a pair of terminals for receiving an alternating input signal;

a first capacitor;
a second capacitor;
a control circuit, connected to said terminals and each of said first capacitor and said second capacitor, for charging said first capacitor to a first predetermined value during a half cycle of an input signal, and charging said second capacitor with the electric charge stored in said first capacitor until the charged potential of said first



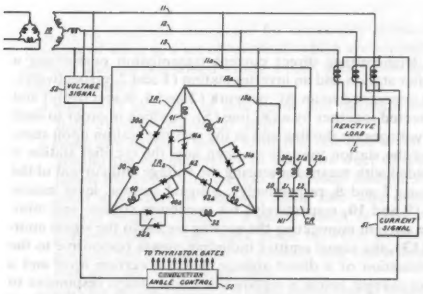
capacitor decreases to a second predetermined value, during a half cycle of said input signal following the half cycle of said input signal during which said first capacitor is charged, thereby controlling said electric charge for charging said second capacitor so that said charge for said second capacitor is constant and generating an output voltage across said second capacitor for supplying output current proportional to the frequency of said input signal to a load.

3,992,661

REACTIVE CURRENT COMPENSATING APPARATUS FOR ELECTRIC POWER SYSTEMS

Fred W. Kelley, Jr., Media, Pa., assignor to General Electric Company, Phila., Pa.

Filed Aug. 25, 1975, Ser. No. 607,652
Int. Cl.² H02J 3/18
U.S. Cl. 323—102 **6 Claims**



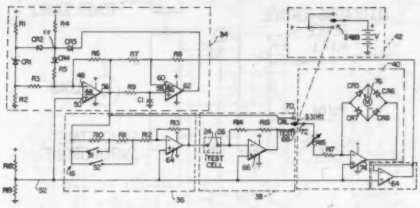
5. Reactive current compensating apparatus for a multiphase alternating current electric power circuit which comprises, reactor line terminals for connection to each phase of said power circuit, a multiphase bank of fixed capacitors connected in star circuit relation between said reactor line terminals and a capacitor neutral terminal, a pair of multiphase banks of fixed inductors connected to said reactor line terminals, respectively, in star and ring circuit relation, means conductively connecting said capacitor neutral terminal to the neutral of said star connected fixed inductors, and means responsive to a characteristic of current in each phase of said power circuit for controlling the magnitude of current traversing a corresponding phase of fixed inductors.

3,992,662

LIQUID CONDUCTIVITY MEASURING DEVICE

Glenn Koepnick; Richard T. Balzen, and Billy D. Etherton, all of Austin, Tex., assignors to Billy D. Etherton; Eugene P. Ziner; William E. Berry and Russell J. Horn, all of Austin, Tex.

Filed Aug. 16, 1974, Ser. No. 498,192
Int. Cl.² G01N 27/42
U.S. Cl. 324—30 R **12 Claims**



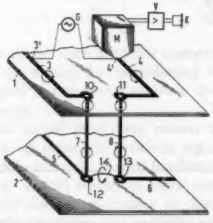
1. An apparatus for measuring the conductivity of liquids comprising:
means for producing an oscillating output signal;
range means, connected to the output of said oscillator means, for varying the amplitude of said output signal of said oscillator means, said range means includes a range operational amplifier, a plurality of resistors connected between the output of said oscillator means and the input of said range amplifier and a plurality of switches connected across said resistors so that selected resistors may be added or removed from the input resistance of said range amplifier and said plurality of resistors is three and said plurality of switches is two, one switch is connected in parallel with a first resistor and the other switch is connected in parallel with said first resistor and a second resistor;
two probes to be placed in contact with the liquid, whose conductivity is to be measured, one of said probes being connected to the output of said range means;
amplifier means, connected to the other of said probes, whose gain varies in response to the conductivity of said liquid; and
an indicator means connected to the output of said amplifier means for indicating said liquid's conductivity.

3,992,663

PROCESS AND APPARATUS FOR LOCATING SHORT-CIRCUITS IN MULTI-LAYER CIRCUIT BOARDS

Peter Seddick, Gauting, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Feb. 7, 1974, Ser. No. 440,280
Claims priority, application Germany, Mar. 9, 1973, 2311903
Int. Cl.² G01R 31/08
U.S. Cl. 324—52 **4 Claims**



1. A device for detecting short circuits on multiconductor stacked boards comprising, an alternating source comprising

a sine wave or pulse generator which has an output frequency of less than one kHz connected to a pair of said multiconductors which are intended to be insulated from each other, a magnetic head detector probe moveable over a surface of one of said stacked boards to detect the path of current flow between said pair of multiconductors, an alternating current amplifier connected to said magnetic probe, an indicator connected to said amplifier to indicate the flow of current between said pair of multiconductors such that the location of short circuits can be determined, and mechanical scanning means connected to said magnetic head detector probe for moving it longitudinally and laterally over a surface of said stacked boards.

3,992,664

METHOD FOR MEASURING PARAMETERS OF QUARTZ CRYSTAL UNIT AND A NON-REACTIVE CONSTANT RESISTANCE ELEMENT FOR CARRYING OUT THE SAME

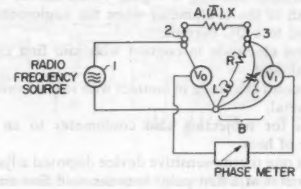
Issac Koga; Isao Okamoto, and Shigeo Kobayashi, all of Tokyo, Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 8, 1975, Ser. No. 638,914

Claims priority, application Japan, Dec. 24, 1974, 50-455; Dec. 24, 1974, 50-456

Int. Cl.² G01R 29/22, 23/00

U.S. Cl. 324—56 **6 Claims**



1. A method of measuring the parameters of crystal units comprising the steps of

a. determining the non-reactive frequency and the non-reactive resistance of a crystal unit A which is of the highest frequency selected from a plurality of crystal units to be tested,

b. applying radio frequency voltage to the series circuit A+B composed of the crystal unit A and a circuit B which is adjustable to non-reactive resistance at a frequency range including the non-reactive frequency of the crystal unit A,

c. adjusting the circuit B to non-reactiveness so that the phase of the voltage across the series circuit A+B and the phase of the voltage across the circuit B coincide,

d. placing, in the position of said crystal unit A, a unit A which is composed of a parallel connection of a high frequency fixed capacitor and a high frequency fixed resistor having a stray inductance with adjustable lengths of lead wires and which is, as a whole, adjustable to a non-reactive constant resistance unit,

e. applying a non-reactive frequency voltage of said crystal unit A to the series circuit A+B,

f. adjusting said stray inductance so that the phase of the voltage across said series circuit A+B coincides with the phase of the voltage across the circuit B and, therefore, said unit A becomes a non-reactive constant resistive element, the resistance of which is virtually equal to its DC resistance, and the resistance of B is given by the relation between the voltages across the series circuit A+B and the circuit B,

g. replacing said unit A by a crystal X which is selected from the remainder of said plurality of crystal units,

h. adjusting the frequency of applied voltage so that the phase of voltage across the series circuit X+B coincides with the phase of voltage across the circuit B,

i. adopting the reading of frequency thus adjusted as the non-reactive frequency of the crystal unit X, or determining the non-reactive resistance of said crystal unit X from the relation between the voltages across the series circuit X+B and the circuit B in a non-reactive condition and thereafter,

j. using said non-reactive constant resistive element (unit A) in place of said crystal unit A.

3,992,665

ELECTRICAL IMPEDANCE MEASURING APPARATUS

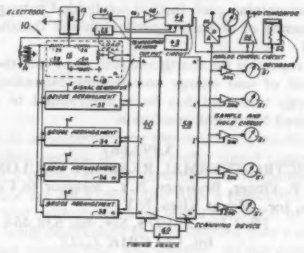
Fritz K. Preikschat, 16020 Lake Hills Blvd., Bellevue, Wash. 98008

Division of Ser. No. 395,736, Sept. 10, 1973, Pat. No. 3,824,461, which is a division of Ser. No. 229,133, Feb. 24, 1972, Pat. No. 3,781,671. This application June 26, 1974, Ser. No. 483,094

The portion of the term of this patent subsequent to July 16, 1991, has been disclaimed.

Int. Cl.² G01R 27/00

U.S. Cl. 324—57 R **13 Claims**



1. A measuring apparatus including:

signal generating means providing a sample signal of a certain frequency and phase;

sensing circuit means connected to said signal generator means and having an output signal, said output signal having a phase related amplitude which is proportional to the impedance of the sample of material;

temperature sensor means monitoring the temperature of a portion of said sample of material and having an electrical output;

first signal shaping circuit means converting the output of said temperature sensor means to an output signal having a temperature related dependence; and,

second signal shaping circuit means combining the output signals of said sensing circuit means and said output signal of said first signal shaping circuit means thereby correcting the phase related amplitude signal of said sensing circuit for temperature related variations.

3,992,666

TECHNIQUE FOR DETECTING ENERGY AND DETERMINING THE FREQUENCY OF CONSTITUENT ENERGY COMPONENTS

James H. Edwards, Alexandria, Va., and Robert M. Mason, Temple Hills, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 27, 1975, Ser. No. 544,464

Int. Cl.² G01R 23/16

U.S. Cl. 324—77 R **6 Claims**

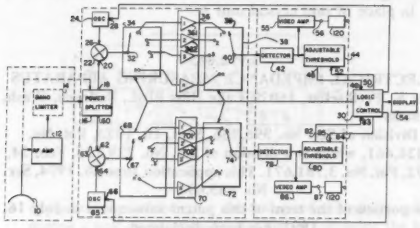
1. A method for detecting energy within a frequency region and for determining the frequency, to a desired bandwidth-

resolution, of components of said energy comprising the steps of:

first, extracting a sample of energy representative of the energy content of the entire of said region;

second, dividing said sample into contiguous subregions which, together, cover the region of the sample;

third, examining each said subregion for the presence of a predetermined threshold energy contained therein;



fourth, subdividing as before each subdivision having a bandwidth greater than said desired bandwidth resolution and containing at least a predetermined threshold energy;

fifth, examining each further subdivided subregion for the presence of at least a predetermined threshold energy; and

sixth, repeating the fourth and fifth steps until the frequency of all of said energy components exceeding a desired energy threshold has been determined to within said desired bandwidth resolution.

3,992,667

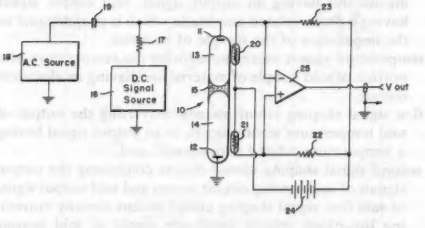
ELECTRO-THERMAL READOUT COULOMETER

Eugene P. Finger, Brewster, N.Y., assignor to Curtis Instruments, Inc., Mount Kisco, N.Y.

Filed Jan. 3, 1975, Ser. No. 538,464

Int. Cl.² G01R 27/22

U.S. Cl. 324—94 **14 Claims**



12. A method for reading an integrator which integrates a current using a coulometer which includes a region having a first resistance disposed between two depositions of material having a different resistance, said region moving along the length of the coulometer as material is deposited from one of said depositions to the other of said depositions when the coulometer is subjected to a DC current, comprising the step of:

a. detecting the presence of said region adjacent a point on said coulometer by monitoring the temperature of said point and detecting a change in said temperature.

13. A method as in claim **12** wherein said region is an electrolyte whose resistance is higher than the resistance of said two depositions of material.

3,992,668

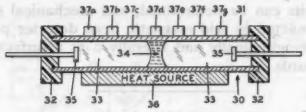
ELECTRO-THERMAL READOUT OF COULOMETERS

Eugene P. Finger, Brewster, N.Y., assignor to Curtis Instruments, Inc., Mount Kisco, N.Y.

Continuation-in-part of Ser. No. 538,464, Jan. 3, 1975. This application July 9, 1975, Ser. No. 594,352

Int. Cl.² G01R 27/22

U.S. Cl. 324—94 **16 Claims**



1. An integrating circuit for integrating a current, comprising:

a. coulometer which includes:

i. an elongated electrically non-conducting body defining a bore;

ii. a first column of liquid metal disposed in said elongated body;

iii. a second column of liquid metal disposed in said elongated body;

iv. a quantity of electrolyte disposed between said first column of metal and said second column of metal, said electrolyte defining a region which moves along the length of the coulometer when the coulometer is subjected to a DC current;

v. a first electrode in contact with said first column of metal; and

vi. a second electrode in contact with said second column of metal;

b. means for subjecting said coulometer to an external source of heat;

c. at least one thermosensitive device disposed adjacent said coulometer at a first point between said first and second electrodes of said coulometer; and

d. circuit means coupled to said thermosensitive device for providing a signal when the temperature sensed by said thermosensitive device changes.

3,992,669

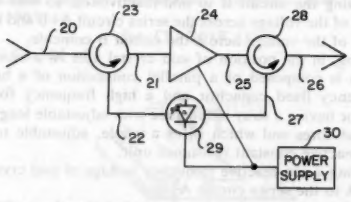
RADIO FREQUENCY PROTECTION CIRCUIT

John Willson Dades, Redwood City, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Aug. 29, 1975, Ser. No. 608,864

Int. Cl.² H04B 1/16, 1/38

U.S. Cl. 325—2 **3 Claims**



1. A radio frequency protection circuit providing a bypass signal path around an active electrical circuit upon the loss of supply voltage, said protection circuit comprising:

an input terminal for receiving an input RF signal;

an output terminal for carrying out an output signal;

an active electrical circuit having an input and output;

a source of supply voltage;

a first RF circulator having a first port connected to said input terminal, a second port, and a third port connected

to the input of said active electrical circuit;

a second RF circulator having a first port connected to the output of said active electrical circuit, a second port connected to said output terminal, and a third port; and

protective circuit means having an input and output, said input coupled to the second port of said first RF circulator and said output coupled to the third port of said second RF circulator, providing an open circuit termination reflecting RF energy during periods of nonfailure of said supply voltage and providing a closed circuit termination conducting RF energy during periods of failure of said supply voltage.

3,992,670

FREQUENCY CONTROL CIRCUITS SUCH AS FOR USE IN MODULATION MEASUREMENT

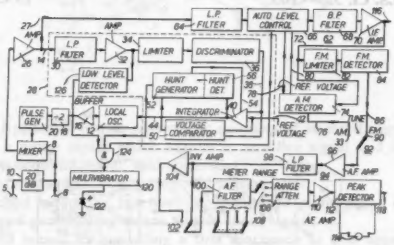
Derek R. Gittins, Wokingham, and Michael D. Gregory, Windsor, both of England, assignors to Racal Instruments Ltd., England

Filed Apr. 3, 1975, Ser. No. 565,017

Claims priority, application United Kingdom, May 21, 1974, 22510/74

Int. Cl.² H04B *17/00*

U.S. Cl. 325—134 **12 Claims**



1. An electrical circuit arrangement responsive to an input signal whose frequency can vary within a first predetermined range and for converting the input signal to a predetermined frequency, comprising

a variable frequency source producing a variable frequency signal variable over a second predetermined range,

mixing means for mixing the input signal with the variable frequency signal so as to produce an intermediate signal whose frequency varies with the two mixed frequencies so as to maintain a predetermined algebraic relationship with the two mixed frequencies as they vary over their said ranges,

discriminator means responsive to the frequency of the intermediate signal as the input signal and the variable frequency signal vary over their respective said ranges, and operative to produce a control signal whose magnitude is dependent on the frequency of the intermediate signal,

a reference a signal source,

integrator means for receiving the control signal and the reference signal so as to produce an integrated error signal which is dependent on the difference therebetween,

means responsive to the magnitude of said integrated error signal to produce a second error signal whose value is dependent on the value of said integrated error signal,

means coupled to said integrator means for increasing the rate at which the mean frequency of the intermediate signal is brought to the value represented by the reference magnitude, and

means for feeding the integrated error signal to the variable frequency source to control the frequency of the variable frequency source in such a direction as to bring the mean frequency of the said intermediate signal to a predetermined value represented by the magnitude of the reference signal.

3,992,671

CIRCUIT ARRANGEMENT FOR AUTOMATIC MONITORING OF PROTECTION TIME PERIODS IN STREET TRAFFIC SIGNAL SYSTEMS

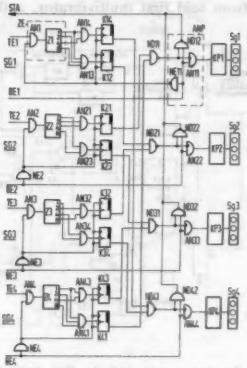
Edgar Rudmann, March-Buchheim, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 6, 1975, Ser. No. 555,839

Claims priority, application Germany, Mar. 18, 1974, 2412963

Int. Cl.² H04B *1/00*; G08G *1/00*

U.S. Cl. 328—63 **4 Claims**



1. A circuit arrangement for the automatic monitoring of protection time periods in street traffic signal systems controlled from a central station, in which the respective signal groups thereof are each controlled over a respective individual control line, with the desired signal condition of each of said groups being determined by the potential state existing on the associated control line, and wherein, on the commencement of the "stop" signal for a group of signals, a switching device determining the portection periods for one or more incompatible signal groups is initiated, comprising a pulse train counter for each group of signals, at the outputs of which counter arbitrary time signals may be obtained representing specific protection time periods, respective individual trigger elements operatively connected to the pertinent incompatible signal groups, to which such time signals are conducted, whereby such trigger elements are set when the corresponding counter step is reached for the desired protective period, and which, for the remainder of the existing "stop" signal, emit a free signal to the pertinent incompatible signal group, and an AND gate operatively linking the "go" signal, for a signal group which is to be released, with all "free" signals of incompatible signal groups.

3,992,672

MULTIPLE CHANNEL COINCIDENCE DETECTOR AND CONTROLLER FOR MICROSEISMIC DATA ANALYSIS

George E. Fasching, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 7, 1975, Ser. No. 620,460

Int. Cl.² H04B *1/04*

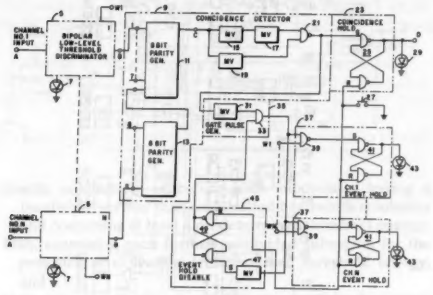
U.S. Cl. 328—110 **5 Claims**

1. A multiple channel coincidence detector for determining the occurrence of at least two events in the form of electrical signals within a preselected time frame in separate channels from a multiple channel input source, comprising:

a plurality of discriminator means equal in number to the number of channels of said input source for generating an output pulse at a corresponding channel discriminator

output upon detection of an event whose magnitude exceeds a preselected threshold level;

a coincidence detector including circuit means having a plurality of inputs connected to respective ones of said plurality of discriminators for providing an exclusive "OR" function at an output thereof of said plurality of said inputs, a first monostable multivibrator connected to the output of said circuit means and generating an output pulse for a first selected period following the detection of an initial event, a second monostable multivibrator connected to the output of said first multivibrator and generating an output pulse for a second selected period equal to said preselected time frame following the period of said pulse from said first multivibrator, a third monostable



multivibrator connected to the output of said circuit means and generating a pulse at the output thereof upon the detection of an event following said initial event, and gating means for gating a pulse at the output of said third multivibrator to an output of said gating means during said preselected time frame; and

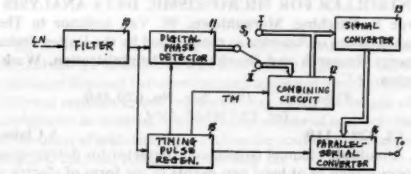
a plurality of event-hold circuit means equal in number to said plurality of channels, each event-hold circuit means having an input connected to respective outputs of said plurality of discriminators and each responsive to the output of said gating means of said coincidence detector for indicating and storing the respective channel locations of said at least two events occurring within said preselected time frame.

3,992,673

SYSTEM FOR DEMODULATING A DIGITAL MODULATED WAVE

Hisakichi Michishita, Machida; Hidetaka Yanagidaira, Ohmoya, and Katsuhiko Furuya, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed June 5, 1974, Ser. No. 476,686
Claims priority, application Japan, June 11, 1973, 48-64691
Int. Cl.² H03K 9/04
U.S. Cl. 329—104 **5 Claims**



1. A system for demodulating a digital modulated wave comprised of signal wave elements of substantially uniform duration and each having a substantially constant phase throughout its duration, comprising:

phase detecting means receptive of said digital modulated wave for detecting the phase of successive portions of each of said signal wave elements and for developing output signals representative of the detected phases of the successive portions of each signal element; and

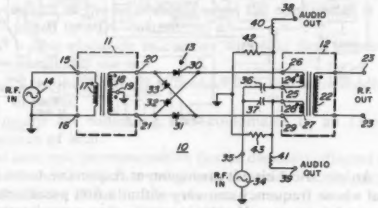
combining circuit means receptive of the detecting means output signals for combining the signals representative of the detected phases of the successive portions of each of said signal wave elements thereby to average noise components combined with said digital modulated wave to reduce the effect of the noise on the detected phase of each signal element represented by the combination of the signals representative of the phase of its successive portions.

3,992,674

BALANCED DUAL OUTPUT MIXER CIRCUIT

Jerry David Meyerhoff, Buffalo Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 6, 1975, Ser. No. 629,332
Int. Cl.² H03D 1/10
U.S. Cl. 329—163 **13 Claims**



1. An improved balanced dual output mixer circuit adaptable for mixing two input RF signals and producing audio or RF output signals, including:

first, second and third RF signal terminals, a reference terminal, and an audio signal terminal, said first and second terminals adaptable for receiving RF input signals,

first circuit means coupled to said first RF terminal for receiving RF signals therefrom and providing substantially equal and opposite polarity RF signals with respect to said reference terminal at two end terminals, said equal signals having the same frequency as said received signals;

second circuit means having first and second coil windings, each with first and second end terminals, and a negative combiner means coupled to said third RF terminal for producing RF output signals at said third RF terminal related to the negative combination of the signals present at said second end terminals;

capacitive coupling means for RF coupling signals from said second RF terminal to said first end terminals of said first and second coil windings;

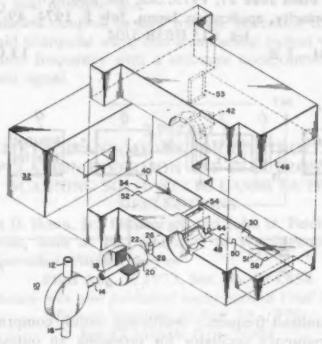
RF choke means for audio frequency coupling said auido terminal to one of said first end terminals of said first and second coil windings; and

third circuit means coupled to said end terminals of the first circuit means and said second end terminals of the first and second coil windings of said second circuit means for creating signals at said second end terminals having the sum and difference frequencies of the signals present at these terminals.

3,992,675
BROADBAND, UPPER SIDEBAND TERMINATED, LOW-NOISE PARAMETRIC AMPLIFIER

Edward C. Niehenke, Elkridge, and Aldo E. Linsenbardt, Catonsville, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,727
Int. Cl.² H03F 7/00
U.S. Cl. 330—4.9 8 Claims



1. Apparatus for the parametric coupling of an input signal with a pump signal which results in an idler signal and an upper sideband signal, said apparatus comprising:

first means for propagating said pump signal;

second means for reactively coupling said pump signal of said propagating means to said input signal;

third means for providing a first reactance to said upper sideband signal to prevent said upper sideband signal from entering said propagating means; and

fourth means for providing a second reactance to said upper sideband signal which is the conjugate of said first reactance and which cooperates with said first reactance to prevent current from flowing at the frequency of said upper sideband signal.

3,992,676
CURRENT AMPLIFIERS

Mark Berwyn Knight, North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,362
Int. Cl.² H03F 3/42
U.S. Cl. 330—18 12 Claims

1. In a current amplifier of the type having input, common and output terminals;

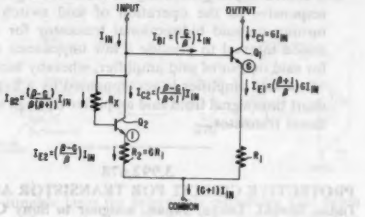
a first junction transistor having a base electrode to which said input terminal is direct-coupled, having a collector electrode direct coupled to said output terminal, and having an emitter electrode;

a first resistance of value R_1 connecting said emitter electrode of said first transistor to said common terminal;

a second transistor having an emitter electrode connected to said common terminal, having collector and base electrodes, and having a direct-coupled collector-electrode-to-base-electrode feedback connection connecting its collector electrode to its base electrode, whereby it operates as a self-biased transistor; and

a second resistance of value R_2 connected between said input terminal and the collector electrode of said second transistor, R_2 being substantially G times R_1 in resistance, the gain of said current amplifier as between its input and output terminals tending as a result of the foregoing connections of elements to be −G; the improvement comprising:

a third resistance included in said direct-coupled collector-electrode-to-base-electrode feedback connection of said

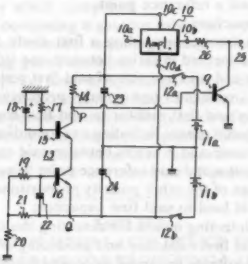


second transistor of a value for making the current gain of said current amplifier as between said input and output terminals more nearly equal to −G.

3,992,677
MUTING CIRCUIT

Katsuaki Tsurushima, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 23, 1975, Ser. No. 570,635
Claims priority, application Japan, Apr. 30, 1974, 49-49190
Int. Cl.² H03F 1/26
U.S. Cl. 330—29 7 Claims



1. A muting circuit comprising:

an amplifier having an input and an output terminal,

a circuit point of low reference potential,

a bidirectional transistor connected in said circuit to a couple a signal from said output terminal to said point of low reference potential,

a supply source coupled in said circuit for said amplifier when coupled thereto,

switch means for coupling and uncoupling said supply source to and from said amplifier,

a control signal generating means coupled to an input of said bidirectional transistor,

said control signal generating means including circuit means responsive to the operation of said switch means for turning on said bidirectional transistor for a predetermined interval to provide a low impedance circuit path for said output of said amplifier, whereby turning on and off of said amplifier is accompanied by a bypassing of a short time signal from said amplifier through said bidirectional transistor.

3,992,678

PROTECTIVE CIRCUIT FOR TRANSISTOR AMPLIFIER

Tadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

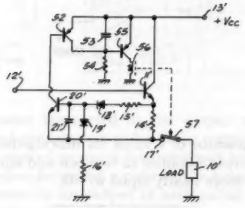
Continuation-in-part of Ser. No. 382,139, July 24, 1973, Pat. No. 3,904,979. This application Mar. 26, 1975, Ser. No. 562,346

Claims priority, application Japan, July 27, 1972, 47-75414

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.² H03F 21/00

U.S. Cl. 330—207 P 7 Claims



1. A protective circuit for a transistor amplifier comprising:

a. a DC voltage source;

b. a first transistor having first, second and third electrodes, said first electrode supplied with an input signal to be amplified and said second electrode connected to said voltage source;

c. a first resistor with one side connected to said third electrode;

d. a load connected between the other side of said first resistor and a reference point;

e. a first capacitor;

f. first circuit means including a first diode and a second resistor connected in series between one side of said first capacitor and said one side of said first resistor to supply a first DC voltage of one polarity proportional to a voltage across said first resistor to said first capacitor;

g. second circuit means including a second diode and a third resistor connected in series between said one side of said first capacitor and said reference point to supply a second DC voltage of the other polarity proportional to a voltage across said load to said first capacitor;

h. voltage detecting means for detecting the output voltage across said first capacitor and producing a control signal when the voltage becomes a predetermined value;

i. switching means controlled by said control signal so as to cut off operation of said first transistor, and wherein said voltage detecting means includes a second transistor having first, second and third electrodes, said first and second electrodes being connected across said first capacitor, said third electrode producing said control signal when the voltage across said first capacitor becomes a predetermined value; and said switching means includes at least one further transistor controlled by said control signal, a relay coil connected as the load for said further transistor, a relay switch controlled by said relay coil and connected between said third electrode of said first transistor and said load so as to cut off the operation of said first transistor.

3,992,679

LOCKED OSCILLATOR HAVING CONTROL SIGNAL DERIVED FROM OUTPUT AND DELAYED OUTPUT SIGNALS

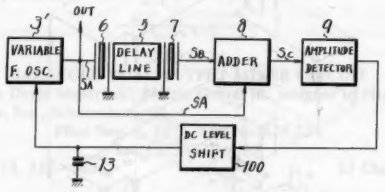
Katsuo Isono, Kawagoe, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed June 27, 1975, Ser. No. 590,917

Claims priority, application Japan, July 5, 1974, 49-76965

Int. Cl.² H03B 3/04

U.S. Cl. 331—1 R 13 Claims



3. A stabilized frequency oscillating circuit comprising, a variable frequency oscillator for providing an output at a frequency determined by the amplitude of a control signal applied to said oscillator, delay means receiving said output of the oscillator for providing a delayed output, means for adding the outputs of said oscillator and delay means, respectively, and providing therefrom a synthesized control signal having an amplitude which varies cyclically in response to changing of the frequency of said output of the oscillator, and means for applying said synthesized control signal to said oscillator as at least part of said control signal for the latter so as to lock said output of the oscillator to a desired frequency.

3,992,680

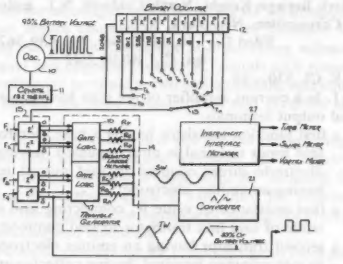
PRECISION TEST FREQUENCY GENERATOR

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed July 30, 1975, Ser. No. 600,31ɔ

Int. Cl.² H03B 19/00

U.S. Cl. 331—61 7 Claims



1. A precision test generator producing sinusoidal output waves in a predetermined range to simulate the output of an instrument yielding a sinusoidal signal within said range, said sinusoidal signal having a noise component superimposed thereon, said test generator comprising:

A. a stable-frequency standard having a predetermined high-frequency;

B. means coupled to said standard to divide the frequency thereof to produce intermediate frequency pulses whose repetition rate is a selected sub-multiple of said high

frequency and a predetermined multiple of the desired output frequency of the test generator within said range, said divider means being constituted by a multi-stage counter provided with a multi-contact selector switch whose contacts are connected to the respective stages of the counter to derive pulses of the desired repetition rate;

C. a triangle generator responsive to said pulses to produce a triangular wave whose frequency corresponds to the desired output frequency, said triangular wave having a staircase formation whose number of steps is determined by said multiple; and

D. means coupled to said triangle generator to transform said triangular wave into a sinusoidal output wave of the same frequency with a staircase component simulating said signal.

3,992,681

METHOD AND MEANS FOR CONTROLLING POPULATION INVERSION AND ELECTRONICALLY SCANNING SOLID STATE LASER OUTPUT DEFLECTIONS

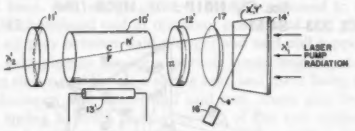
Robert D. Haun, Jr., Pittsburgh, and John D. Feichtner, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 1, 1973, Ser. No. 384,654

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² H01S *3/10, 3/094*

U.S. Cl. 331—94.5 M **12 Claims**



1. A method for controlling the spatial and temporal output of a laser oscillator, said method comprising:

directing a broad area pump laser beam through an end reflector of said oscillator into the laser medium to pump a substantial portion of the height and breadth of said medium for raising said laser above its oscillation threshold,

positioning a spatial and temporal modulator between said oscillator and said pump laser,

varying the transmission of the modulator to vary the transmission of the pump laser beam at selected small portions of the beam's cross section for selectively varying the cross sectional portion of said laser medium which is raised above its oscillation threshold by said pump laser beam.

3,992,682

TWO-DIMENSIONAL LASER SCANNING SYSTEM

Matthew B. White, 258 Forest Ave., and Fred W. Quelle, Jr., 120 Nichols Road, both of Cohasset, Mass. 02025

Filed Sept. 19, 1974, Ser. No. 507,646

Int. Cl.² H01S *3/10, 3/101*

U.S. Cl. 331—94.5 K **6 Claims**

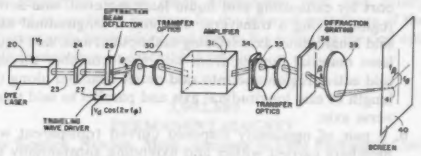
1. Apparatus for producing two-dimensional laser beam scanning comprising:

a frequency tunable laser oscillator having a resonant cavity of fixed dimensions;

a frequency scannable traveling wave driver having lines of constant refractive index disposed in the path of the beam output of and outside of said cavity for selectively linearly deflecting said beam output;

means outside said laser cavity for amplifying said linearly deflected beam output; and

means disposed outside of said cavity in the path of said amplified beam output and responsive to the frequencies



of said tunable laser for selectively deflecting said beam output orthogonal to said selective linear deflection thereof.

3,992,683

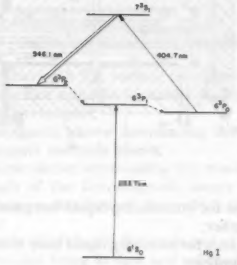
OPTICALLY PUMPED COLLISION LASER IN HG AT 546.1 NM

Nicholas I. Djeu, Bethesda, Md., and Ralph L. Burnham, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 28, 1975, Ser. No. 581,594

Int. Cl.² H01S *3/22, 3/093*

U.S. Cl. 331—94.5 G **4 Claims**



1. A continuous-wave, optically pumped, electronic-state, collision laser which comprises:

means for containing a gaseous mixture;

said gaseous mixture including atoms of mercury and a quenching gas of nitrogen;

an optical pump lamp in optical pumping relationship with respect to said containing means for creating a population inversion between certain energy levels of said atoms; and

means optically coupled to said gaseous mixture for stimulating the emission of a laser beam from the inverted atoms on the 546.1 nm transition of atomic mercury.

3,992,684

FLASHLAMP PUMPED LASER DEVICE EMPLOYING FLUID MATERIAL FOR PRODUCING LASER BEAM

Richard M. Patrick, Winchester; Herbert W. Friedman, Peabody, and John W. McCloskey, Waltham, all of Mass., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Continuation of Ser. No. 436,573, Jan. 25, 1974, abandoned. This application May 19, 1975, Ser. No. 578,825

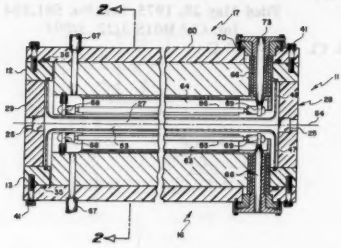
Int. Cl.² H01S *3/20*

U.S. Cl. 331—94.5 L **32 Claims**

1. In a liquid laser device for producing a laser beam along its optical axis employing a liquid laser material flowing in a direction transverse to and through said optical axis., the combination comprising:

a. means defining a hollow elongated body member having an active region intermediate and coupled to an inlet chamber having an inlet port for receiving said liquid laser material and an outlet chamber having an outlet port for exhausting said liquid laser material, said active region having a transverse axis and a longitudinal axis, said longitudinal axis defining said optical axis, said liquid laser material flowing from said inlet chamber through said active region and into said outlet chamber along the length of said longitudinal axis and parallel to said transverse axis;

b. a pair of oppositely disposed curved transparent wall members carried within and extending substantially the length of said body member intermediate said inlet and outlet chambers, said wall members each curving inwardly and having an innermost central window portion intermediate first and second side portions, said central window portions defining opposed sides of said active region, said first side portions defining a portion of said inlet chamber adjacent the upstream end of said active region and said second side portions defining a portion of said outlet chamber adjacent the downstream end of said active region;



c. first means for introducing liquid laser material into said inlet chamber;

d. second means for receiving liquid laser material from said outlet chamber;

e. diverter means disposed in said outlet chamber arranged and adapted to at least substantially prevent increase in pressure in said liquid laser material as it flows out of said active region;

f. high intensity light means for energizing liquid laser material in said active region;

g. removable means for directing a flow of coolant over said light means, said means including a pair of elongated generally U-shaped reflective members, said light means being disposed in said U-shaped members whereby substantially all of the light from said light means is directed into said active region;

h. insulating means at least substantially preventing the transfer of heat into said liquid laser material through said inlet chamber first side portions; and

i. means for coupling said laser beam out of said body member along said optical axis.

3,992,685

CHEMICAL LASER PUMP

John R. Ogren, La Palma; Eugene V. Rutkowski, Palos Verdes, and Marvin Appel, Redondo Beach, all of Calif., assignors to TRW Systems & Energy, Redondo Beach, Calif.

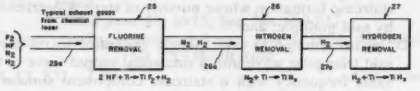
Continuation of Ser. No. 286,242, Sept. 5, 1972, abandoned. This application Mar. 18, 1976, Ser. No. 668,169

Int. Cl.[2] H01S *3/095*

U.S. Cl. 331—94.5 G **10 Claims**

1. A chemical laser including a laser cavity, an exhaust, and a pump for removing exhaust gases from the laser cavity at supersonic speeds and sufficient low pressure to sustain lasting action in a closed system:

the pump consisting of a powdered metal selected from the class consisting of titanium, zirconiun, hafnium, vanadium, niobium, tantalum, yttrium, scandium, elements 57–71 of the periodic table, lithium, sodium, potassium, rubidium, cesium, beryllium, palladium, magnesium,



strontium, calcium, barium, boron, gallium and mixtures and alloys thereof,

the exhaust gases being selected from the class consisting of hydrogen, deuterium and their halides, the halogens, nitrogen, CO_2, oxygen and water vapor;

the metal of said pump being adapted to react with the exhaust gases to form solid reaction products therewith.

3,992,686

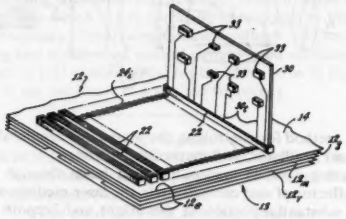
BACKPLANE TRANSMISSION LINE SYSTEM

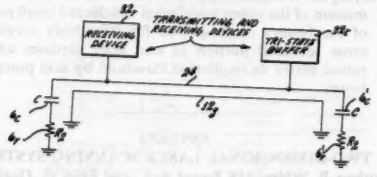
Tim W. Canning, Berkeley, Calif., assignor to The Singer Company, Elizabeth, N.J.

Filed July 24, 1975, Ser. No. 598,592

Int. Cl.[2] H01P *3/08;* **H02B** *1/04*

U.S. Cl. 333—84 M **21 Claims**





1. An assembly comprising:

a plurality of transmission lines made up of a plurality of etched microstrip traces on at least one outer insulating surface of a backplane, said backplane having at least a ground plane sandwiched between the outer insulating surfaces, and wherein

at least some of said transmission lines are terminated at both ends thereof with their characteristic impedance,

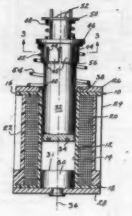
said impedance including a resistance-capacitance network.

3,992,687

BUZZ-PROOF SOLENOID

Spencer C. Schantz, New Berlin, and Paul W. Wilberscheid, Sussex, both of Wis., assignors to Spencer C. Schantz, New Berlin, Wis.

Filed June 20, 1975, Ser. No. 588,574
Int. Cl.² H01F 7/12
U.S. Cl. 335—247 15 Claims



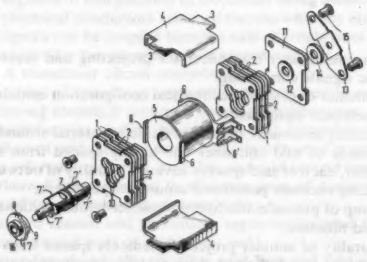
1. In a solenoid having a coil, having means supporting said coil, having a bore in said coil supporting means, and having a ferromagnetic plunger axially movable within said bore between an inner position and an outer position and having a portion projecting beyond one axial end of the bore, the improvement comprising a flexible wedging sleeve slideably mounted on a projecting portion of the plunger, a chamfered end on said coil supporting means adjacent to said axial end of said bore, said wedging sleeve being positioned to coact with said chamfered end in the inner position of said plunger to take up play between said plunger and said coil supporting means, said plunger having a portion projecting beyond the wedging sleeve and having a spring seat, and there being a first spring between said sleeve and said seat, there also being a second spring between the upper end of the coil supporting means and said sleeve serving as a return spring for the plunger, with the first spring being stiffer than the second spring.

3,992,688

ROTARY ARMATURE SOLENOID

Erich Keck, Fuerstenfeldbruck, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 20, 1975, Ser. No. 606,175
Claims priority, application Germany, Aug. 23, 1974, 2440566
Int. Cl.² H01F 7/08
U.S. Cl. 335—272 7 Claims



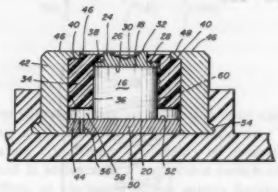
1. A rotary solenoid with a cylindrical armature having its effective pole faces respectively disposed adjacent the ends thereof, comprising a hollow actuating coil, stator poles respectively having a plurality of pole laminations formed from sheet metal and disposed in respective aligned stacks at opposite ends of the actuating coil, respective bearing members for the armature shaft disposed at the outer faces of the respective pole stacks, each bearing member having an inwardly directed bearing boss thereon, extending into the adjacent stack with the respective bosses being engageable with and axially aligned in operative position by the internal pole faces of the adjacent pole lamination, and means for retaining the coil and pole laminations in assembled relation.

3,992,689

PERMANENT MAGNET

Roy Kaplow, Newton, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.

Filed July 28, 1975, Ser. No. 599,631
Int. Cl.² H01F 7/02
U.S. Cl. 335—302 10 Claims



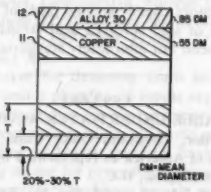
1. A magnet assembly comprising:
a permanent magnet having opposite forward and rearward pole faces;
a pole piece having a flat surface in continuous, intimate abutting contact with the forwardly facing pole face of the permanent magnet;
a non-ferromagnetic sleeve surrounding the abutting permanent magnet and pole piece;
a ferromagnetic sleeve surrounding the non-ferromagnetic sleeve, each of the ferromagnetic sleeve and the pole piece defining a flat forward face which lie in the same plane; and
a ferromagnetic plug closing the inner end of the ferromagnetic sleeve and being in firm and substantially continuous electrical contact therewith, the plug having interior, forwardly facing surface in flat, substantially continuous contact with the opposite rearward pole face of the permanent magnet.

3,992,690

COMPOSITE ELECTROMAGNETIC COIL

Charles J. Sperr, Jr., Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Jan. 31, 1975, Ser. No. 546,065
Int. Cl.² H01F 15/16
U.S. Cl. 336—179 9 Claims



1. An electromagnetic coil useful over a widely varying range of temperatures which draws relatively low wattage at low temperatures and provides relatively high ampere turn output at high temperatures, comprising:

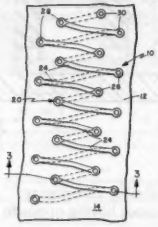
a. a first winding of a wire having a first positive value temperature coefficient of resistance; and
b. a second winding of a wire having a second positive value temperature coefficient of resistance less than the first positive value temperature coefficient of the wire of the first winding, the second winding being arranged in magnetic aiding relationship with said first winding and bearing a predetermined thickness ratio thereto.

3,992,691

ELECTRONIC CIRCUIT BOARD FLAT COIL INDUCTOR

Edward H. Molthen, Ramona, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed July 2, 1975, Ser. No. 592,389
Int. Cl.² H01F *5/00, 27/28*
U.S. Cl. 336—200 **2 Claims**



1. A flat coil inductor for electronic circuit boards, comprising:
a circuit board having first and second spaced, generally flat electrically insulated surfaces,
at least a first and a second series of holes extending along said surfaces and extending through said board,
said first series of holes being generally parallel to said second series of holes,
a first conductive pattern applied to a first surface of said board and comprising a first series of straps connecting between said first and second series of holes,
a second conductive pattern applied to said second surface of said board and comprising a second series of straps extending between said first and second series of holes,
a conductive layer on at least a portion of the walls of said holes, said conductive layer completing an electrical circuit through said straps and holes forming at least one generally helical pattern,
conductive paths surrounding said holes,
the axis of said helix is between and parallel to said first and second series of holes,
individual holes in said series of holes are in a staggered pattern, alternate holes being spaced closer to and further from said axis,
on one of said surfaces said straps alternately extend between the more closely spaced pairs of holes,
on the other of said surfaces said straps extend between equally spaced but alternately staggered pairs of holes.

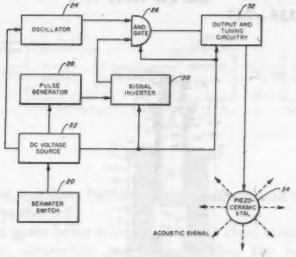
3,992,692

PROGRAMMABLE UNDERWATER ACOUSTIC BEACON

Armand Jay Filer, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 23, 1975, Ser. No. 598,474
Int. Cl.² G01S *1/72;* **H04B** *11/00*
U.S. Cl. 340—5 R **12 Claims**

1. A self contained acoustic beacon for providing an independent method of locating a floating or submerged recoverable target comprising:
a. means for producing an electrical signal;
b. automatic switch means for activating said means for producing an electrical signal;
c. oscillator means for producing an acoustic frequency electrical signal;



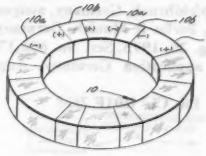
d. programmable pulse generating means for producing a signature gating signal which can be discretely varied in both duration and rate;
e. means for gating said acoustic frequency electrical signal in accordance with said signature gating signal; and
f. transducer means for transmitting an acoustic signal derived from said acoustic frequency electrical signal.

3,992,693

UNDERWATER TRANSDUCER AND PROJECTOR THEREFOR

Joseph E. Martin, Los Angeles, and Gene Zilinskas, Van Nuys, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Filed Dec. 4, 1972, Ser. No. 312,085
Int. Cl.² H04B *13/00*
U.S. Cl. 340—10 **5 Claims**



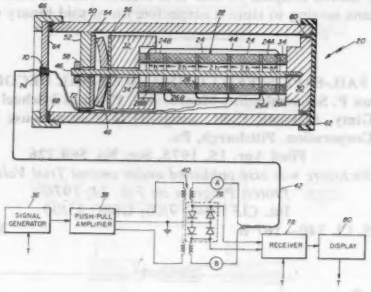
1. An underwater transducer for projecting and receiving acoustic signals comprising:
a container of generally cylindrical configuration containing electronic equipment;
a plurality of annular spacers of flexible material around the outside of said container and axially spaced from each other, each of said spacers having a plurality of outwardly facing recesses positioned around its periphery;
a group of piezoelectric hydrophone elements positioned in said recesses;
a plurality of annular projector elements spaced from said container and supported on said spacers, said projector elements being axially spaced from each other alternately with said groups of hydrophone elements, each said projector element comprising a plurality of alternate segments of active piezoelectric material and other material having a sound velocity greater than that of said active piezoelectric material.

3,992,694

TRANSDUCER WITH HALF-SECTION ACTIVE ELEMENT

Stanley L. Ehrlich, Middletown, R.I., assignor to Raytheon Company, Lexington, Mass.

Filed Feb. 20, 1975, Ser. No. 551,569
Int. Cl.² H04B 13/00
U.S. Cl. 340—10 5 Claims



1. A transducer for providing a conversion between electric energy and acoustic energy comprising:

an array of transducer segments, each of said segments having a first end and a second end thereof opposite said first end;

a plurality of electrodes, the number of electrodes being one more than the number of said transducer segments in said array;

said transducer segments being arranged end-to-end along a line, one of said electrodes being positioned between each pair of said transducer segments contiguous thereto and in electrical contact therewith, one of said electrodes of said plurality of electrodes being positioned at a first end of said array in contact with a first end of a first one of said transducer segments of said array, another electrode of said plurality of electrodes positioned at a second end of said array in contact with a second end of a last transducer segment of said array of transducer segments; and

means for electrically coupling said electrode positioned at said first end of said first transducer segment to said electrode positioned at said second end of said last transducer segment, said electrode positioned at said first end of said first transducer segment and said electrode positioned at said second end of said last transducer segment being electrically insulated from the remaining ones of said plurality of electrodes, alternate ones of the remaining ones of said plurality of electrodes being connected by electrical conductors attached thereto whereby electrical signals can be coupled between said alternate ones of said electrodes for energizing said transducer.

5. A transducer circuit comprising:

an array of transducer segments arranged end-to-end and having electrical terminals coupled therebetween;

a transformer winding having first and second terminals thereof and a center tapped terminal thereof coupled to a reference potential, said first and said second terminals thereof being coupled to alternate ones of a plurality of said transducer segment terminals;

first and second end transducer segments coupled to first and second ends of said array; and

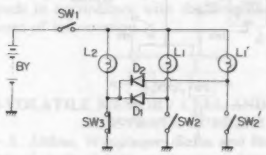
means for electrically coupling said first and said second end transducer segments to provide a difference of potential across said first end transducer segment equal in magnitude to the difference of potential between said first terminal of said transformer winding and said center tapped terminal of said transformer winding.

3,992,695

APPARATUS FOR DETECTING THE FAULT OF INDICATING LAMPS

Takaaki Mogi, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Nov. 11, 1974, Ser. No. 522,870
Claims priority, application Japan, Nov. 30, 1973, 48-138033[U]
Int. Cl.² B60Q 1/00
U.S. Cl. 340—60 9 Claims



1. In a motor vehicle having an indicating lamp circuit of the type including a plurality of switches responsive to motor vehicle operating conditions; a plurality of indicating lamps each connected in series with a respective switch of said plurality of switches; an electrical power source having a pair of terminals; a vehicle ignition switch connected between one terminal of said power source and each of said indicating lamps; means defining an electrically conductive path between the other terminal of said power source and each of said switches; and means for automatically simultaneously energizing said indicating lamps to permit detection of faulty indicating lamps wherein said means for simultaneously energizing said indicating lamps comprises:

a normally closed switch responsive to the motor oil pressure and opened when the motor oil pressure exceeds a certain value, said normally closed switch connected in parallel with each series combination of said switches with the respective ones of said indicating lamps; and

a plurality of diodes each connected between the junction of a respective one of said switches with its respective indicating lamp and said normally closed switch, said diodes having a polarity effective to complete a conductive circuit path between the terminals of said power source defined by said ignition switch, said indicating lamps, said diodes, said normally closed switch, and said means defining an electrically conductive path;

whereby said indicating lamps are automatically simultaneously energized and fault-free ones of said indicating lamps are illuminated to indicate their fault-free condition when said ignition switch is closed and the vehicle motor oil pressure is less than the certain value.

3,992,696

SELF-CHECKING READ AND WRITE CIRCUIT

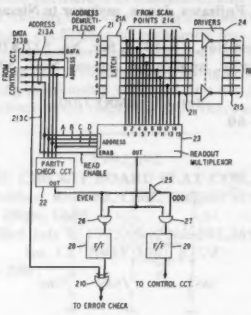
Allen Dennis Fergeson, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 27, 1975, Ser. No. 591,140
Int. Cl.² G06F 11/00
U.S. Cl. 340—146.1 AG 10 Claims

1. An arrangement for detecting faults in a multiplexor having an output and a plurality of inputs separable into an even parity group including inputs corresponding to binary numbers having even parity and an odd parity group including inputs corresponding to binary numbers having odd parity, and further having means for generating a signal on said output in response to received address signals and data signals appearing at said plurality of inputs said arrangement comprising:

a source for generating known data inputs connected to one of said parity groups;

means for detecting the parity of said received address signals; and



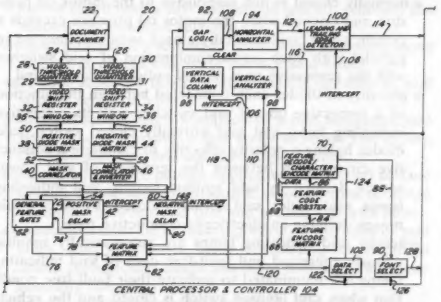
means cooperating with said detecting means and responsive to a data input generated by said source for comparing said generated data input to the signal on said multiplexor output when said address signals have the same parity as said one of said parity group.

3,992,697

CHARACTER RECOGNITION SYSTEM UTILIZING FEATURE EXTRACTION

John L. Knab, Philadelphia, and John J. McIntyre, Ardsley, both of Pa., assignors to Scan-Data Corporation, Norristown, Pa.

Filed Dec. 27, 1974, Ser. No. 537,046
Int. Cl.² G06K 9/12
U.S. Cl. 340—146.3 MA **18 Claims**



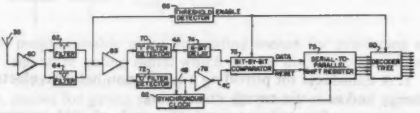
1. In a character recognition system comprising means for scanning a character on a document field, said character being composed of plural features, each feature being a two dimensional portion of said character within a respective geographic area defined on said character, a video shift register having a plurality of stages for serially storing and shifting a binary quantization of the character pattern sample within said field, each of said geographic areas being defined by plural rows and plural columns of bits of said binary quantization, improved feature extraction logic comprising a plurality of independent feature detecting means, each formed in a predetermined shape having at least two rows and two columns of bits, each of said feature detecting means being responsive to said binary quantization to provide a respective signal indicative of the recognition by said masking means of the associated predetermined two dimensional feature as the character pattern sample passes through selected stages of said video shift register, said feature detecting means being coupled to said selected stages of the video shift register and to means for enabling said feature detecting means only during the time interval in which the character pattern sample corresponding to the portion of the character within a respective geographic area passes through said selected stages of the video shift register, first encoding means connected to said feature detectors for encoding the signals from said feature detectors into plural, multi-bit binary codes, one such code for each of said geographic areas, each bit of each code defining a shape characteristic of the feature within said area, whereupon the code formed by said bits indicates the two dimensional shape of the feature detected within said geographic area and plural storage means coupled to said first means, each of said storage means serving to store a respective on of said binary codes.

3,992,698

FAIL-SAFE SPEED COMMAND SIGNAL DECODER

Arun P. Sahasrabudhe, Monroeville, Pa., and Michael V. McGinty, Alameda, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1975, Ser. No. 568,226
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² H04Q 9/00; G08C 25/00
U.S. Cl. 340—167 B **3 Claims**



1. In a transportation vehicle control system having a vehicle receiver for decoding a vehicle command signal having complementary message signals which carry coded information, the apparatus comprising:

means for isolating signals which are substantially equal to said message signals of said vehicle command signal;

means for amplifying said message signals;

first and second means for detecting first and second messages from said first and second message signals respectively;

means for delaying said first detected message;

means for storing, in a fail-safe manner, said delayed message when it is substantially equal to said second detected message; and

means for decoding said stored message.

3,992,699

FIRST-IN/FIRST-OUT DATA STORAGE SYSTEM

Guenter F. Krumbach, Huntington Beach, Calif., assignor to Communication Mfg. Co., Long Beach, Calif.

Filed Nov. 13, 1974, Ser. No. 523,335
Int. Cl.² G11C 19/00, 21/00
U.S. Cl. 340—172.5 **30 Claims**

1. A first-in/first-out data storage system alternatively operating in a read mode and a write mode, the system comprising:

a shift register having a storage capacity of *n* stages in which data units can be stored;

a modulo-n address counter having one state of representing each stage of the shift register, the state of the address counter between operations indicating the number of stages of the shift register in which data units are stored;

an input circuit;

an output circuit;

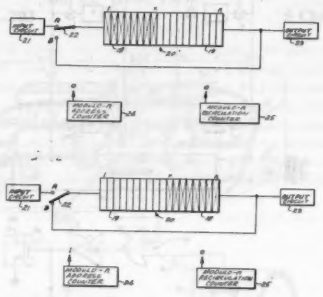
input switching means to transfer data units from the input circuit to the input of the shift register in a first state and to recirculate data units from the output of the shift register to the input of the shift register in a second state;

output switching means to transfer data units from the output of the shift register to the output circuit in a first state and to recirculate data units from the output of the shift register to the input of the shift register in a second state;

means during the write mode for placing the input switching means in the first state to transfer data units;

means for shifting the data units stored in the shift register one stage and advancing the address counter one state for each data unit transferred during the write mode;

means during the read mode for placing the output switching means in the first state after the address counter is in



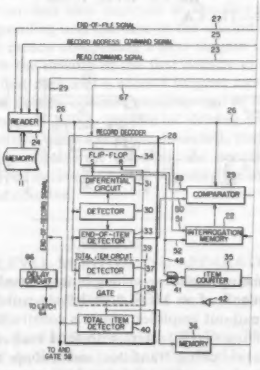
a given state representing an empty shift register, and placing the output switching means in the second state after the address counter is in the other states representing shift register stages in which data units are stored; and

means for shifting the shift register *n* times and advancing the address counter *n* - 1 times for each data unit transferred during the read mode.

3,992,700
INFORMATION RETRIEVING APPARATUS

Tamotu Nakazawa; Kenzoh Ina, both of Yokohama, and Takashi Minagawa, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1975, Ser. No. 578,421
Claims priority, application Japan, May 21, 1974, 49-56937
Int. Cl.² G06F *13/00*
U.S. Cl. 340—172.5 **10 Claims**



1. An information retrieving apparatus comprising:

memory means for storing a plurality of records, each of said records including a plurality of items of information having different assigned weights;

reading means for reading out the records stored in said memory means;

input means for receiving interrogation information;

comparing means coupled to said reading means and to said input means for detecting coincidence between the output from said reading means and said interrogation information, and having an output for providing a signal when coincidence is detected;

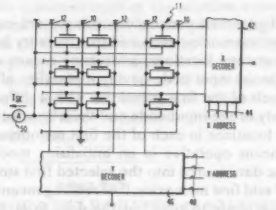
discrimination means coupled to said comparing means output for determining the respective weights of items of information in response to coincidence signals; and

selector means coupled to said discrimination means for selecting particular items of information from said records in accordance with the weights of said coincident items of information.

3,992,701
NON-VOLATILE MEMORY CELL AND ARRAY USING SUBSTRATE CURRENT

Shakir A. Abbas, Wappingers Falls, and Robert C. Dockerty, Highland, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 10, 1975, Ser. No. 567,045
Int. Cl.² G11C *11/40, 7/00*
U.S. Cl. 340—173 R **12 Claims**



1. A non-volatile read mostly memory cell comprising:

a monocrystalline semiconductor substrate embodying a first type background impurity;

spaced source and drain regions of a second opposite type impurity in said substrate defining a channel region therebetween;

a gate dielectric layer capable of trapping a charge overlying said channel region;

a gate electrode overlying said channel region between said source and drain regions;

a substrate contact electrode;

writing means to induce a trapped charge into said dielectric gate layer including:

means to apply a voltage significantly larger than the threshold voltage to said gate electrode to form an inversion layer in said channel region; and

means to apply a voltage less than the avalanching voltage to reverse bias said drain region causing channel current to flow thereby causing charge injection into said gate dielectric layer;

erasing means to remove the trapped charge from said dielectric gate layer including:

means to apply a voltage equal to or exceeding the avalanche voltage to said drain region to cause avalanching;

reading means to determine the presence or absence of a charge in said gate dielectric including means to apply a voltage to reverse bias said drain region that is significantly less than the avalanche voltage, and means to monitor the substrate current;

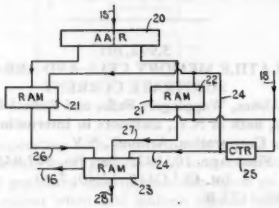
means to apply a voltage to the gate electrode that is slightly in excess of the threshold voltage; and

means to monitor the substrate current.

3,992,702
CODE CONVERSION ARRANGEMENTS FOR ADDRESSES TO FAULTY MEMORY LOCATIONS

Nigel Ronald Hassall Bailey, Stevenage, England, assignor to International Computers Limited, Stevenage, England

Filed Apr. 16, 1975, Ser. No. 568,691
Claims priority, application United Kingdom, May 1, 1974, 18988/74
Int. Cl.² G11C 8/00, 29/00
U.S. Cl. 340—173 BB 5 Claims



1. A digital code conversion arrangement including a plurality of first memories, each said first memory having a plurality of first storage locations; addressing means operative in response to an input code having a plurality of portions to address each of the first memories with a different portion respectively of the input code and thereby select one of the first storage locations in each of the first memories; a data source; input means operative in an initialising mode to enter data from the data source into the selected first storage location of each of said first memories; first reading means operative in an operating mode to read out the data from the selected first storage location of each first memory; and output means operative to derive an output code from the data read out by said first reading means from the selected first storage locations.

3,992,703
MEMORY OUTPUT CIRCUIT

James A. Luisi, Anaheim; Clarence W. Padgett, Fountain Valley, and Dana C. Street, Placentia, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 513,366, Oct. 9, 1974, abandoned.
This application Aug. 13, 1975, Ser. No. 604,517
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R 16 Claims

1. A memory output circuit including means to read data from an array comprised of a plurality of memory cells having a memory operating cycle comprising an active and a recovery portion, each of said memory cells connected between first and second data bus lines, and including

a power amplifier having output and input data terminals to receive binary coded data from said memory cell array,

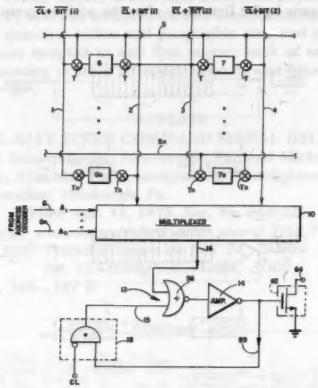
first gate means connected to an input terminal of said power amplifier,

interfacing means connected between the first data bus line and said first gate means,

feedback path means connected from an output terminal of said power amplifier to said first gate means through a feedback control gate means,

said feedback control gate means adapted to be enabled by a clock signal applied thereto in order to activate said feedback path means, and

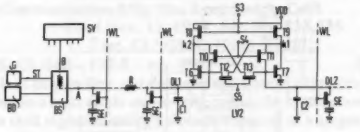
said power amplifier, said first gate means and said feedback control gate means forming an output data latch to preserve the binary state of the data at the output terminal of said power amplifier when said clock signal enables said feedback control gate means to activate said feedback path during a period of time corresponding to the recovery portion of said memory operating cycle.



3,992,704
ARRANGEMENT FOR WRITING-IN BINARY SIGNALS INTO SELECTED STORAGE ELEMENTS OF AN MOS-STORE

Dieter Kantz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 5, 1975, Ser. No. 610,756
Claims priority, application Germany, Sept. 11, 1974, 2443529
Int. Cl.² G11C 13/00
U.S. Cl. 340—173 CA 5 Claims



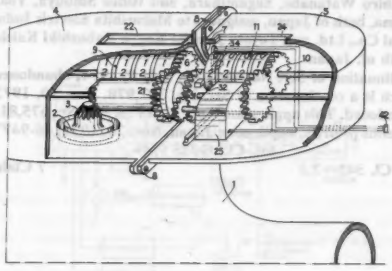
1. In an arrangement for writing binary signals into selected storage elements of an MOS store having word and bit lines, utilizing a read-out amplifier which is constructed as a pulsed flip-flop, having two inverters with feed-back, each of which comprises a switching transistor and a load transistor, with each feed-back arm of the flip-flop having a cut-off transistor disposed therein, the combination of each bit line of the storage elements being connected to the control gate input of a respective switching transistor of the read-out amplifier, a bit switch connected to one bit line, adapted to be connected to a bit decoder and a line supplying a write-in pulse train, for control of the bit switch thereby, operative to thus transfer the write-in information to only the bit line cooperable therewith.

3,992,705

REMOTE ADDING AND READING DEVICE FOR A METER

Michel Langenfeld, Vandoeuvre-les-Nancy, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed June 10, 1975, Ser. No. 585,722
Claims priority, application France, June 12, 1974, 74.20363
Int. Cl.² G08C 19/16
U.S. Cl. 340—203 5 Claims



1. In a remote meter reading system comprising a main totalizing register having a first decade counter for connection to measuring means of a meter to be driven by the measuring means and accumulate a first unit total, and a device for taking a reading of the meter at a station remote from the meter, the device comprising an auxiliary totalizing register having a reversible second decade counter for accumulating a second unit total by unit in accordance with unit increase in the first unit total, resetting means combined with the second decade counter for producing a decrease in the second unit total unit by unit and resetting the second decade counter to zero unit total, means for actuating the resetting means from said station, counting means for counting the number of units by which the second unit total is decreased to reach said zero; the improvement comprising a first case completely enclosing the main totalizing register, a second case completely enclosing the auxiliary totalizing register, means for separably connecting the second case to the first case, transmission means for drivingly connecting the first decade counter to the second decade counter so that unit increase in the first unit total results in corresponding unit increase in the second unit total, the transmission means comprising a first magnet connected to be driven with the driving of the first decade counter and disposed in the first case and a second magnet connected to rotate the second decade counter and disposed in the second case, the first magnet being capable of driving the second magnet when the two cases are interconnected, the transmission means being capable of allowing the second decade counter to be driven in reverse by the resetting means without affecting the first counter.

3,992,706

LIQUID LEVEL MONITORING APPARATUS

Thomas P. Tunney, 589 Stanton Ave., Baldwin, N.Y. 11510, and James W. Campbell, 151 Lincoln Ave., Rockville Center, N.Y. 11570

Continuation-in-part of Ser. No. 535,108, Dec. 20, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,851
Int. Cl.² G08B 21/00
U.S. Cl. 340—239 R 13 Claims

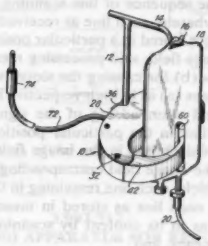
1. Monitoring apparatus for use during the intravenous adminstration of a solution from a flexible plastic bag that is freely supported on an arm, said apparatus comprising:

a. a housing;

b. spring actuated switch means having integral contact means, said switch means being mounted on said housing and adapted to be electrically connected to alarm means for generating a signal when the condition of said switch means changes in response to the reduction of the contents of the bag to a predetermined volume;

c. a first arm pivotally mounted on said housing and having a portion thereof in engagement with said bag, said first arm including means for actuating said switch means;

d. a second arm adjustably mounted on said housing; and



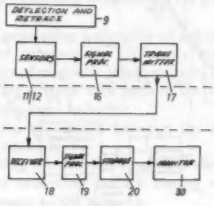
e. first spring means extending between said first arm and said second arm whereby, when the contents of the plastic bag is reduced to said predetermined volume after the initiation of the administration of the solution contained therein, the total force exerted by the plastic bag overcomes the sum of the forces exerted by the spring that actuates said spring actuated switch means and said first spring means and wherein the force of said first spring means may be varied by displacing said second arm to thereby vary the total force required to change the condition of said switch means.

3,992,707

REPRODUCTION OF A FIELD OF VIEW AS SCANNED BY A REMOTE CONTROLLED AIRCRAFT

Hubertus Schmidtlein, Brinkum, and Joachim Berger, Bremen, both of Germany, assignors to Vereinigte Flugtechnische Werke-Fokker Gesellschaft mit beschrankter Haftung, Bremen, Germany

Filed Sept. 13, 1974, Ser. No. 505,732
Int. Cl.² G01S 9/02
U.S. Cl. 343—5 CM 17 Claims



1. A system for reproducing an image of a particular field-of-view from a remote controlled vehicle, and along its travel path, comprising:

sensing means on the vehicle and provided for continuously line scanning the field of view, the lines running transversely to the direction of propagation of the vehicle, thereby providing a line scan signal of on a continuous basis, and representing the lines covering the field-of-view sequentially and continuously as the vehicle progresses the lines running transverse to the direction of propagation of the vehicle and without field scan transverse to the direction of the lines other than the move-

ment of the vehicle transversely to the direction of the lines;

first means for transmitting the line scan signal to a station being stationary or moving independent from the vehicle;

second means for receiving said transmitted line scan signal at said station;

signal processing means including means (a) for storing said line scan signal as sequentially received with respect to sequential lines for assembling information of an image field in the sequence of line scanning, and as a plurality of lines, whereby each line as received for storage by the means (a) is stored in a particular position corresponding in the image field, said processing means further including means (b) for causing the stored signal to be shifted in the means (a) as to their respective line positions in the image field upon adding of the signals of each newly received line in the particular position, so as to obtain shifting of each line in the image field to different positions in the image field corresponding to the progression of the vehicle, each line remaining in the store until being dumped; each line as stored in means (a) is not being updated as to its content by scanning signals from the sensing means; and

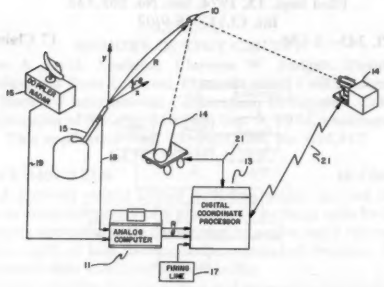
display means connected to the means for storing, and displaying on a screen the plurality of the lines as stored in the means (a) repeatedly and independently from the updating of the image in the means (a), but including each new scanning line and the lines as shifted by operation of the means (b), resulting in shifting of the display of the lines across the screen at a rate proportional to and representative of the speed of the vehicle, whereby each line as initially stored is displayed repeatedly but in different positions on the screen.

3,992,708

OPTICAL TRACKING ANALOG FLYWHEEL

Larry Ray Olson, and J. Max Massey, Jr., both of King George, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 18, 1975, Ser. No. 597,252
Int. Cl.² G01S 9/02
U.S. Cl. 343—6 R **4 Claims**



1. An optical tracking system which acquires and maintains track on gun-fired projectiles or rocket targets comprising:

a target;

means to launch said target;

an analog computer for continuously simulating the trajectory of said target and for continuously generating signals representative of the real time position of said target along its trajectory, said analog computer operatively connected to said launching means whereby the simulation is begun at launch;

a digital coordinate processor electrically connected to the output of said analog computer wherein the output signals of said analog are analyzed in accordance with stored data and a signal representative of target position is generated;

at least one tracking mount; and

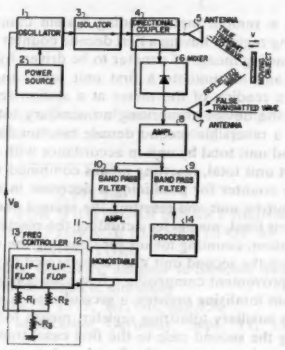
a telemetry link responsive to the output of said digital coordinate processor, slaving each of said tracking mounts to said analog computer.

3,992,709

DOPPLER RADAR

Masahiro Watanabe, Sagamihara, and Hideo Shibuya, Yokohama, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd. and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Continuation of Ser. No. 486,760, July 9, 1974, abandoned, which is a continuation of Ser. No. 307,970, Nov. 20, 1972, abandoned. This application Apr. 12, 1976, Ser. No. 675,816
Claims priority, application Japan, Nov. 24, 1971, 46-94774
Int. Cl.² G01S 9/44
U.S. Cl. 343—7.5 **7 Claims**



1. A Doppler radar for measuring the relative velocity of a moving object comprising:

a mixer for mixing a part of a transmitted wave and a reflected wave from said relatively moving object to produce a Doppler signal, the input to said mixer including a sporadically received false wave which can cause interference with said Doppler signal,

first and second band pass filters coupled to the output of said mixer, said first filter transmitting signals in the Doppler frequency region and said second filter transmitting only components in the output of said mixer outside said Doppler frequency region which are produced by mixing said transmitted wave with said false wave,

means coupled to said first band pass filter for receiving a continuous signal corresponding to the relative velocity of said moving object, and

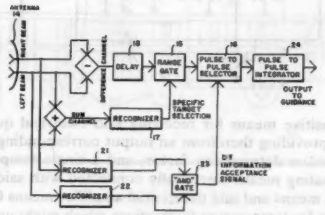
means coupled to said second band pass filter for varying the frequency of said transmitted wave to bring the mean frequency difference between said transmitted and false waves out of the frequency region wherein said false wave can disturb the Doppler signal, said frequency varying means being controlled by the output of said second filter.

3,992,710

TARGET TRACKER HAVING TARGET RECOGNITION MEANS

Thomas L. Gabriele, Timonium; Francis J. Willey, III, Catonsville, both of Md., and Charles W. Ziegler, Ann Arbor, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 22, 1973, Ser. No. 335,205
Int. Cl.² G01S 9/22
U.S. Cl. 343—16 M 4 Claims



1. In a monopulse radar system having antenna means for transmitting two displaced antenna beams with a common boresight, the combination comprising,

first receiver means connected to said antenna means for receiving echo signals from one of said beams,

second receiver means connected to said antenna means for receiving echo signals from the other said beam,

means for subtracting said received echo signals,

a range gate connected to the output of said means for subtracting said received echo signals,

a pulse to pulse selector connected to the output of said range gate,

integration means connected to the output of said pulse to pulse selector,

first target recognizing means connected to said range gate for accurate placement and reduction of size of said range gate when said first target recognizing means recognizes said echo signals to be characteristic of a desired target, and

second target recognizing means connected to said pulse to pulse selector for accepting the output of said range gate for integration only when said second target recognizing means recognizes said echo signals to be characteristic of a desired target.

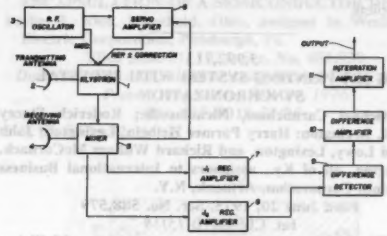
3,992,711

FIRST AND FOURTH HARMONIC SYSTEM

William L. Stoakes, Fort Wayne, Ind., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 4, 1956, Ser. No. 613,988
Int. Cl.² G01S 9/38
U.S. Cl. 343—17.5 4 Claims

3. A radar system comprising a continuous wave transmitter frequency signal which transmits a carrier, a relatively low frequency source coupled to the transmitter for phase modulating the carrier signal, a receiver for receiving an echo signal and coupled to said transmitter, said receiver including a mixer for beating the echo signal with the carrier signal, means for separating and selectively amplifying the first and fourth



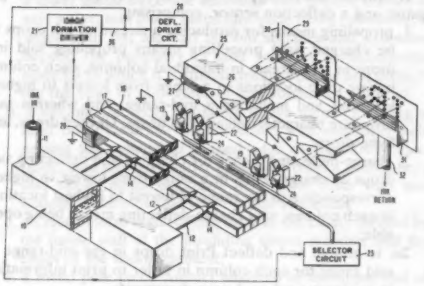
harmonic components of the mixer output signal, and means for comparing said components.

3,992,712

METHOD AND APPARATUS FOR RECORDING INFORMATION ON A RECORDING SURFACE

Frederick H. Dill, South Salem; George J. Fan, Ossining, and Richard A. Toupin, Briarcliff Manor, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed July 3, 1974, Ser. No. 485,409
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 20 Claims



1. A method for recording information on a recording surface including:

simultaneously generating a plurality of substantially parallel streams of substantially uniformly spaced droplets from a plurality of magnetic liquid streams for application to the recording surface with each of the streams having substantially the same velocity;

producing relative movement between the recording surface and the streams;

separately selecting the droplets of each of the streams to be applied to the recording surface having relative movement with respect to the streams;

directing each of the streams of droplets through a deflecting means;

applying a magnetic field gradient from the deflecting means to the same number of droplets of each of the streams passing through the deflecting means to produce a deflection on each of the droplets of each of the streams in an orthogonal direction to that in which relative movement occurs between the recording surface and the streams to produce a scan of the plurality of the droplets of each of the streams for printing, if selected, in a plurality of spots in a line on the recording surface;

and synchronizing the starting and stopping of the application of the magnetic field gradient to the droplets of each of the streams passing through the deflecting means in

accordance with the simultaneous generation of the droplets of each of the streams so that the deflections in the orthogonal direction are applied to the desired number of droplets.

3,992,713

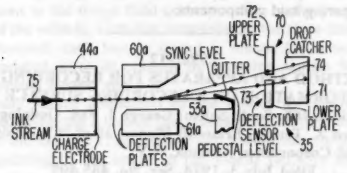
INK JET PRINTING SYSTEM WITH PEDESTAL SYNCHRONIZATION

John Michael Carmichael, Nicholasville; Roderick Stacey Heard, Lexington; Harry Parmer Heibein, Lexington; John Alfred Lowy, Lexington, and Richard William McCornack, Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 20, 1975, Ser. No. 588,579

Int. Cl.² G01D *15/18*

U.S. Cl. 346—75 **12 Claims**



1. Synchronization apparatus for an ink jet printer having a gutter and a deflection sensor, comprising:

1. propelling means for producing a stream of ink drops to be charged, said propelling means propelling said ink drops in said stream in individual columns, each column having drop locations in a range from lowest to highest locations and including a mid-range, and wherein said drops are characterized as Print drops, Unused drops, and Sync drops;

2. charge-deflecting means for charging and deflecting said drops at charge levels in a range from lowest to highest corresponding to the range of lowest to highest locations in each column; said charge-deflecting means being operable;

2*a*. to charge and deflect Print drops in the mid-range of said range for each column in order to print information in successive columns on a document;

2*b*. to charge and deflect Unused drops in the lowest portion of said range thereby directing them to said gutter; and

2*c*. to charge and deflect Sync drops in the highest portion of said range by charge pulses that are referenced from a pedestal voltage level, thereby insuring fast rise times for said charge pulses and accurate charge levels on said ink drops and directing them past said deflection sensor whereby said Sync drops are capacitively coupled to said deflection sensor and produce signals therein representative of their relative locations, with respect to said sensor.

3,992,714

PHOTOGRAPHIC FILM EXPOSURE DETERMINING SYSTEM COMPENSATED FOR TEMPERATURE AND VOLTAGE FLUCTUATIONS

Seinan Miyakawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

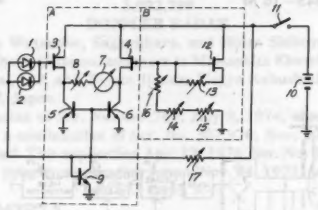
Filed Oct. 31, 1975, Ser. No. 627,915

Claims priority, application Japan, Nov. 14, 1974, 49-131343

Int. Cl.² G03B *7/08*

U.S. Cl. 354—38 **10 Claims**

1. In a system wherein exposure time and diaphragm aperture form a pair of exposure-determining factors one of which is to be automatically determined by the system in connection with exposure of film in a camera, photosensitive means for responding to light intensity at an object which is to be photographed for providing an electrical quantity corresponding to said light intensity, exposure-determining factor circuit means for providing an electrical quantity corresponding to a combination of the sensitivity of the film which is to be exposed and the other of said pair of factors, differential amplifier means electrically connected between said circuit means and said



photosensitive means for receiving said electrical quantities and for providing therefrom an output corresponding to said one exposure-determining factor, and a single temperature-compensating means electrically connected with said photosensitive means and said differential amplifier means for compensating for temperature fluctuations which might undersirably influence the operation of said photosensitive means and differential amplifier means.

3,992,715

LOW-NOISE THERMO-IONIC INJECTION DIODE

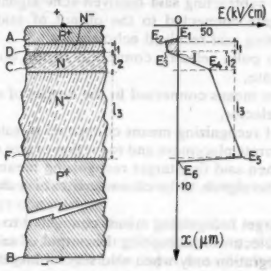
Daniel Delagebeaudeuf, and Didier Meignant, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Sept. 8, 1975, Ser. No. 611,551

Claims priority, application France, Sept. 10, 1974, 74-30621

Int. Cl.² H01L *29/90*

U.S. Cl. 357—13 **5 Claims**



1. A thermo-ionic injection diode destined to operate at a predetermined frequency, comprising between two extreme layers of a semiconductor material doped to produce a first conductivity type, the doping impurity ratio being high enough to allow said layers to play the role of electrodes:

a first layer of a semiconductor material doped to a lesser extent than said extreme layers in order to produce the opposite conductivity type, the thickness of said layer being very low in comparison to the thickness producing a transit angle close to $3\pi/2$ at said frequency;

a second and a third layer of the same semiconductor as said first layer, doped to a lesser extent than the extreme layers in order to produce the opposite conductivity type, the doping impurity ratio of the second layer being higher than that of said first and third layers, the total thickness

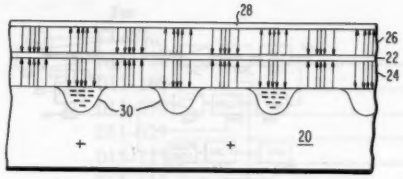
of said second and third layers producing a transit angle close to $3\pi/2$ at said frequency.

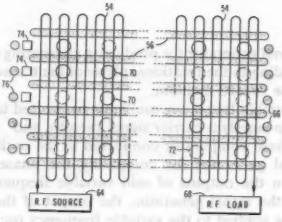
3,992,716

METHOD AND APPARATUS FOR PROPAGATNG POTENTIAL INVERSION WELLS

Thomas Herman DiStefano, Tarrytown, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 23, 1974, Ser. No. 472,783
Int. Cl.² H01L 29/78; H01P 3/00
U.S. Cl. 357—24 10 Claims





1. A circuit arrangement for propagating potential inversion wells, together with minority carriers which may be contained therein, along the surface of a single conductivity type semiconductor charge storage medium having charge domain barrier means defining a plurality of matrix rows in which the potential inversion wells are confined to propagate, comprising:

a. a slow-wave structure disposed closely adjacent the surface of said semiconductor charge storage medium for propagating an electromagnetic wave at a velocity lower than the maximum drift velocity of electrical charges in said semiconductor medium in electrical fields produced therein by said electromagnetic wave, potential inversion wells being established in the surface of said semiconductor medium at intervals of one wavelength of said electromagnetic wave corresponding to areas of maximum field strength, said slow-wave structure being configured as a meander line defining matrix columns generally transverse to the matrix rows in said semiconductor charge storage medium,

b. a source of radio frequency electrical signals coupled to said slow-wave structure, and

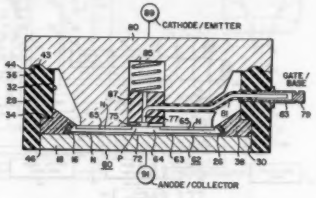
c. charge generator means coupled to said semiconductor medium for generating electrical charges in said semiconductor medium and controllably transferring the generated electrical charges to a propagation chanel in said semiconductor medium defined by said slow-wave structure.

3,992,717

HOUSING FOR A COMPRESSION BONDED ENCAPSULATION OF A SEMICONDUCTOR DEVICE

Leslie R. Rice, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 21, 1974, Ser. No. 481,930
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² H01L 23/28
U.S. Cl. 357—72 3 Claims



1. A semiconductor device, said semiconductor device comprising:

a. a fusion element, said fusion element comprising a wafer of semiconductor material, said wafer having top and bottom major opposed flat parallel surfaces, an upper metal electrode affixed to said top surface of said wafer, a lower metal electrode affixed to said bottom surface of said wafer, siad lower metal electrode being cylindrical in shape with flat top and bottom surfaces and extending beyond the periphery of said wafer of semiconductor material to which it is affixed, means coating and protecting the edge of said wafer of semiconductor material;

b. a flexible electrical insulating sleeve member having at least one cylindrical shaped inside wall elastically held against the cylindrical shaped edge of said lower electrode, said sleeve member extending from a point above said upper metal electrode to a point flush with said bottom surface of said lower metal electrode;

c. an elastomeric material disposed in the cavity formed by the inside wall of the insulating sleeve member and the edges of the fusion element;

d. a metal pole piece contact adjoined to the upper end of the sleeve member and having a projection extending into the sleeve and making electrical contact with the fusion element.

3,992,718

COLOR PANORAMIC LASER PROJECTOR

Carl R. Driskell, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 23, 1975, Ser. No. 543,594
Int. Cl.² H04N 3/08, 9/14
U.S. Cl. 358—61 6 Claims

1. A color panoramic laser projector for connection to a color television pickup system, including pickup tubes, capable of supplying red, blue and green video output signals representative of a real time 360° scene comprising:

a. separate lasers for producing red, blue, and green laser beams;

b. modulator means for receiving said red, blue, and green video signals to modulate respectively said red, blue, and green laser beams and to control the output values thereof;

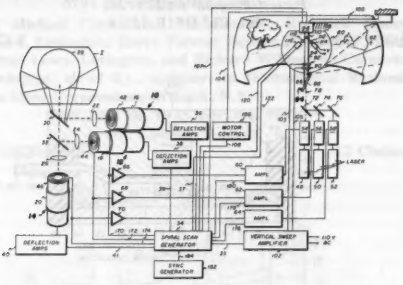
c. a reflector mixer system of three reflectors positioned to receive respectively the modulated red, blue, and green laser output signal from said laser beam modulating means and to combine them as a single mixed color beam;

d. a 360° display screen;

e. a 360° reflector centered at the center of generation of said display screen;

f. scan means for redirecting said signle mixed color beam to said 360° reflector and thence to said 360° display screen; and

g. said modulator means including separate pockel cells for respectively receiving said red, blue, and green video



signas, a camera video amplifier and a display video amplifier connected in series between each pickup tube and its associated pockel cell, and a spiral scan generator connected to provide modulating signals to said camera video amplifiers to produce nearly uniform display brightness by controlling the strength of the laser beam output signals via said respective pockel cells.

3,992,719

VIDEO SIGNAL RECORDING/REPRODUCING APPARATUS WHEREIN THE PHASE OF THE RECORDED SIGNAL IS SYNCHRONIZED WITH THE SCANNING HEAD

Yukihiko Machida, Mitaka, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,582

Claims priority, application Japan, Apr. 9, 1974, 49-40226

Int. Cl.² H04N *5/795*

U.S. Cl. 360—37 **11 Claims**

1. Apparatus for recording video signals, said apparatus comprising:

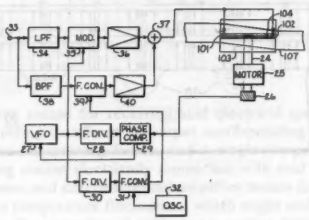
A. a record medium;

B. a rotatable signal recording transducer by which the video signals are recorded on said record medium in successive record tracks which extend substantially parallel to each other;

C. an input terminal to which the video signals are supplied;

D. an output terminal from which a modulated video signal is supplied to the signal recording transducer;

E. a signal modulator connected between said input and output terminals to modulate signals applied to the input terminal and to supply the resulting modulated signals to the output terminal;



F. a signal generator for producing alternating signals corresponding to the rotational phase of the transducer relative to the record medium;

G. a variable frequency oscillator connected to the modulator to supply a carrier signal thereto; and

H. a phase comparator connected to the oscillator and the signal generator for comparing the phase relation between the outputs of said variable frequency oscillator and the signal generator, the output of the comparator being applied to the variable frequency oscillator so that the output phase thereof is controlled by an error signal of the comparator in response to the rotational phase of the transducer relative to the record medium.

DESIGN PATENTS

GRANTED NOVEMBER 16, 1976

ERRATA

For CLASS	See PATENT NO.
011–125	242,363
011–160	242,364
011–090	242,376
011–029	242,377
015–123	242,382
015–123	242,386
015–089	242,387

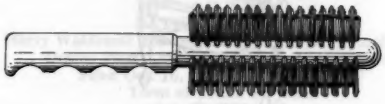
DESIGNS

NOVEMBER 16, 1976

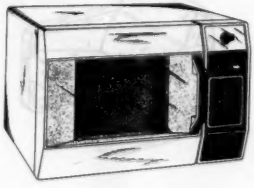
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

242,298
BASEBALL GLOVE
James Robert McTear, 32 Squadron Line, Simsbury, Conn. 06070
Filed May 27, 1975, Ser. No. 580,844
Term of patent 14 years
Int. Cl. D2—*06*
U.S. Cl. D2—361

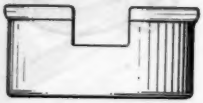
242,299
HAIR BRUSH
Evan R. Kahn, 868 NE. 160th Terrace, North Miami Beach, Fla. 33162
Filed Jan. 16, 1974, Ser. No. 433,849
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31



242,300
MICROWAVE OVEN
Martin H. Pitstick, Cleves, Ohio, and Jon M. Newgard, Louisville, Ky., assignors to General Electric Company
Filed May 12, 1975, Ser. No. 576,630
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



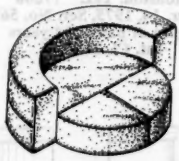
242,301
SUPPORT BASE FOR A BEVERAGE URN OR THE LIKE
Thomas E. Little, 2610 Nicholson St., Houston, Tex. 77008
Filed Apr. 14, 1975, Ser. No. 567,777
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—130



242,302
COMBINED BLENDER AND STORAGE JAR
Alfred W. Madl, Glendale, Wis., assignor to Oster Corporation, Milwaukee, Wis.
Filed June 11, 1975, Ser. No. 585,953
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—154

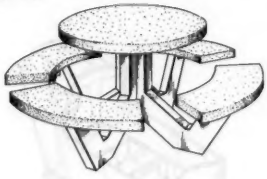
242,303
COMBINED CRADLE AND DISPLAY CABINET
Luther Shehan, P.O. Box 803, Spindale, N.C. 28160
Filed Feb. 21, 1975, Ser. No. 551,607
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—4

242,304
CONVERTIBLE SEAT OR SIMILAR ARTICLE OF FURNITURE
Frank W. Petersilie, Boone, N.C., assignor to Investments and Innovative Concepts, Inc.
Continuation of design applications Ser. No. 501,624 and Ser. No. 501,627, both Aug. 29, 1974, both now abandoned. This application Aug. 13, 1975, Ser. No. 604,174
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—4



242,305
COMBINED TABLE AND MULTIPLE SEAT UNIT
Clifford E. Campbell, Schofield, David D. Spangler, Rothschild, Richard J. Hunt, Schofield, and Charles S. Wipfli, Rothschild, Wis., assignors to Wausau Tile, Wausau, Wis.
Filed Dec. 20, 1974, Ser. No. 535,011
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—45

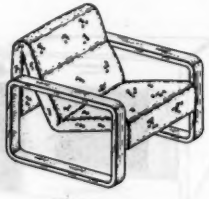
242,306
COMBINED TABLE AND MULTIPLE SEAT UNIT
Clifford E. Campbell, Schofield, David D. Spangler, Rothschild, Richard J. Hunt, Schofield, and Charles S. Wipfli, Rothschild, Wis., assignors to Wausau Tile, Wausau, Wis.
Filed Dec. 20, 1974, Ser. No. 535,094
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—45



242,307
HANGING CHAIR
Bruce M. Furino, 2839 Lion Heart Road, Winter Park, Fla. 32789
Filed Oct. 2, 1974, Ser. No. 511,298
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

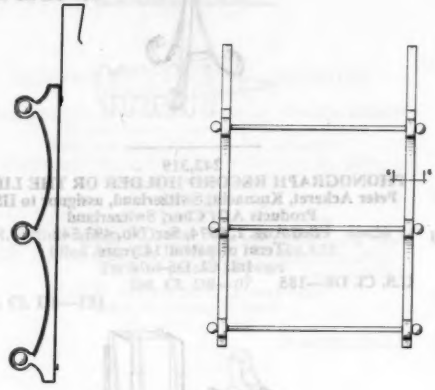
242,308
ARMCHAIR OR THE LIKE
Joseph E. Adkinson, 3807 Leland St., Chevy Chase, Md. 20015
Filed Apr. 23, 1974, Ser. No. 463,285
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—68

242,309
CHAIR
David Woods, Quakertown, Pa., assignor to Quaker Chair Corporation, Quakertown, Pa.
Filed May 9, 1975, Ser. No. 575,945
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

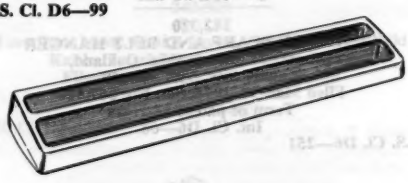


242,310
SEAT
Judith W. Fister, 7715 Park Creek Drive, Centerville, Ohio 45459
Filed May 13, 1975, Ser. No. 577,093
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

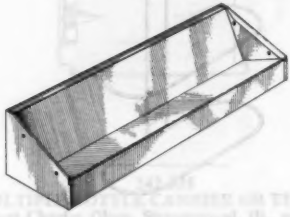
242,311
TOWEL RACK
Jerry A. Brown, 4014 San Jose Drive, Greenwood, Ind. 46142
Filed July 10, 1975, Ser. No. 594,763
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—99



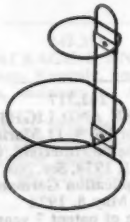
242,312
BATH TOWEL RAIL
Harry Waldemar Thomasson, Paarp, Sweden, assignor to Osmos Plast Aktiebolag, Helsingborg, Sweden
Filed Oct. 16, 1975, Ser. No. 623,199
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—99



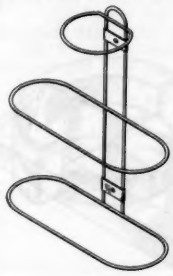
242,313
BOOKSHELF
Adair C. Stentz, Columbus, Ohio, assignor to The Columbus Show Case Company, Columbus, Ohio
Filed Mar. 17, 1976, Ser. No. 667,671
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132



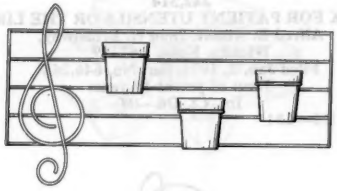
242,314
RACK FOR PATIENT UTENSILS OR THE LIKE
Alfred E. Arnett, 7600 N. Broadway, Wichita, Kans. 67219
Filed Jan. 2, 1976, Ser. No. 646,265
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—134



242,315
RACK FOR PATIENT UTENSILS OR THE LIKE
Alfred E. Arnett, 7600 N. Broadway, Wichita, Kans. 67219
Filed Jan. 2, 1976, Ser. No. 646,264
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—134



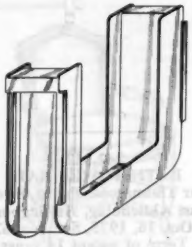
242,316
COMBINED WALL MOUNTED HOLDER AND FLOWER POTS THEREFOR
Robert B. Bowman, R.R. 4, Box 8A1, Lebanon, Ind. 46052
Filed Oct. 9, 1975, Ser. No. 621,072
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—137



242,317
COMBINED DESK AND LIGHT THEREFOR
Ernest Hofmann Igl, 9–11 Marienburgerstr., 8200 Rosenheim-Mitterfeld, Germany
Filed Nov. 1, 1974, Ser. No. 520,144
Claims priority, application Germany May 2, 1974; May 8, 1974
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—162

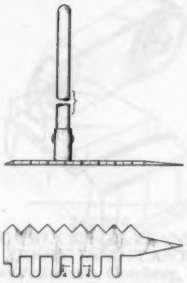
242,318
STAND FOR POTTED PLANTS
Ismael Gomberoff and Patricio Uribe, both of 6965 Guide Meridian Ave., Lynden, Wash. 98264
Filed Nov. 10, 1975, Ser. No. 630,450
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—183

242,319
PHONOGRAPH RECORD HOLDER OR THE LIKE
Peter Ackeret, Kusnacht, Switzerland, assignor to IISI Products AG, Chur, Switzerland
Filed Aug. 1, 1974, Ser. No. 493,542
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—185

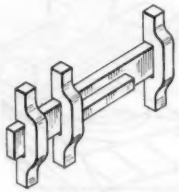


242,320
COMBINED SCARF AND BELT HANGER
Lenore T. Allen, 3316 Oakland, Kansas City, Mo. 64129
Filed Mar. 17, 1976, Ser. No. 667,510
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—251

242,321
COMBINATION RAKE
Stanley P. Smith, 71 Millbridge St., Pittsburgh, Pa. 15210
Filed Jan. 17, 1975, Ser. No. 541,771
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—6



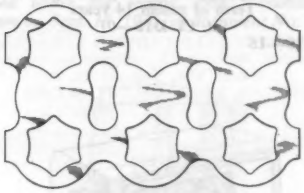
242,322
LATCH
R. Arthur Miles, P.O. Box 333, Clio, Mich. 48420
Filed Aug. 22, 1975, Ser. No. 606,832
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—131



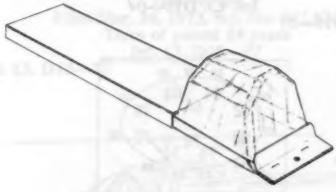
242,323
BOLT
Toru Ono, Izumi, Osaka, Japan, assignor to Kabushiki Kaisha Izumi Seisakusho, Osaka, Japan
Filed Oct. 7, 1975, Ser. No. 620,338
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—264

242,324
BOTTLE OR SIMILAR ARTICLE
Daniel A. Gartin, 151 W. 86th St., New York, N.Y. 10024
Filed May 14, 1975, Ser. No. 577,618
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—52

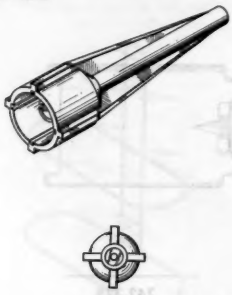
242,325
MULTIPLE BOTTLE CARRIER OR THE LIKE
Robert Charles Olsen, Streamwood, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Jan. 31, 1975, Ser. No. 545,857
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—178



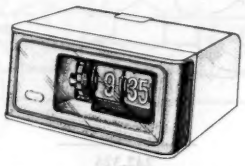
242,326
COMBINED PACKAGING AND DISPLAY BOX
Tony Astor Thorman, Kungalv, and Lars-Hugo Ohlsson, Partille, Sweden, assignors to AB Volvo, Goteborg, Sweden
Filed Apr. 14, 1975, Ser. No. 568,059
Claims priority, application Sweden Oct. 14, 1974
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—224



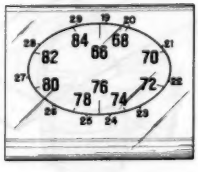
242,327
FOAM-PRODUCING NOZZLE TIP
Barry L. Schneider, Crystal Lake, Ill., assignor to Chemtrust Industries Corporation
Filed Jan. 3, 1974, Ser. No. 430,499
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—290



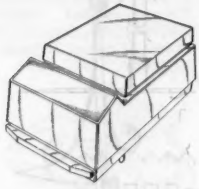
242,328
DIGITAL ALARM CLOCK
Hideaki Nagata, Tokyo, Japan, assignor to Copal Company Limited, Tokyo-to, Japan
Filed Feb. 27, 1975, Ser. No. 553,727
Claims priority, application Japan Aug. 29, 1974
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



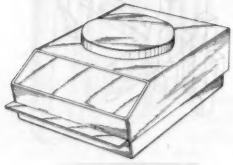
242,329
THERMOCHROMIC THERMOMETER
Philip L. Van Kersen, P.O. Box 40423, Indianapolis, Ind. 46240
Filed Dec. 18, 1974, Ser. No. 533,867
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57



242,330
WEIGHING SCALE
Ernst Strickler, Wolfhausen, and Eduard Fringeli, Rapperswil, Switzerland, assignors to Mettler Instrumente AB, Zurich, Switzerland
Filed May 1, 1975, Ser. No. 573,559
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91

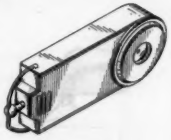


242,331
ELECTRONIC WEIGHING SCALE
Peter Kunz, Meilen, and Paul Kern, Hombrechtikon, Switzerland, assignors to Mettler Instrumente AB, Zurich. Switzerland
Filed June 3, 1975, Ser. No. 583,171
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91

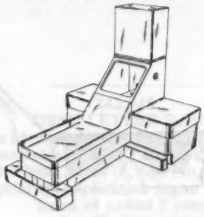


242,332
ALARM CONTAINER
Joseph T. Sullivan, Huntingdon Valley, and Charles M. Cavanagh, Newtown Square, Pa., assignors to Safety Systems Corporation, King of Prussia, Pa.
Filed Apr. 8, 1975, Ser. No. 566,123
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106

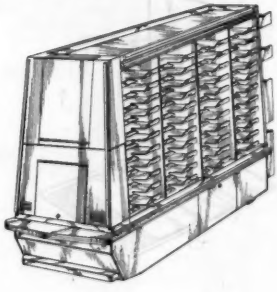
242,333
SECURITY ALARM DEVICE
Wayne T. Wise, Box 175, Frankfort, S. Dak. 57440
Filed Dec. 12, 1975, Ser. No. 640,062
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



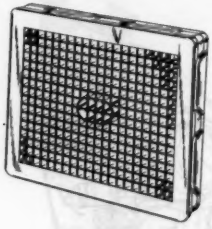
242,334
ELECTRIC TRUCK FOR TRANSPORTING GOODS IN A PLANT
Sven Lars Mikael Pettersson, Goteborg, Sweden, assignor to AB Volvo, Goteborg, Sweden
Filed Jan. 10, 1975, Ser. No. 540,161
Claims priority, application Sweden July 11, 1974
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—1



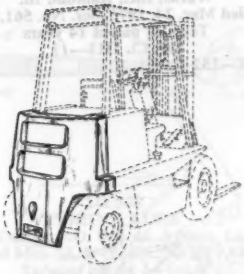
242,335
SELF-PROPELLED DELIVERY VEHICLE
Jack A. Cooper and Gerald D. Mortenson, Grand Rapids, Mich., assignors to Lear Siegler, Inc., Santa Monica, Calif.
Filed Sept. 10, 1975, Ser. No. 611,984
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—1



242,336
PALLET
Rudolf Steinlein, 8 Munich 70, Almbachstrasse 8, Munich, Germany
Filed Oct. 10, 1974, Ser. No. 513,856
Claims priority, appplication Germany Apr. 11, 1974
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D12—53

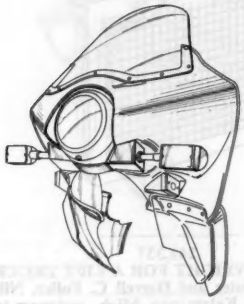


242,337
COUNTERWEIGHT FOR A LIFT TRUCK
Donald J. De Priester and Darrell C. Fuller, Niles, and Jack E. Loomis, Kalamazoo, Mich., assignors to Clark Equipment Company, Buchanan, Mich.
Filed Nov. 27, 1974, Ser. No. 527,788
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—60
Published under the second Trial Voluntary Protest Program on Sept. 16, 1975, as document No. B823,492

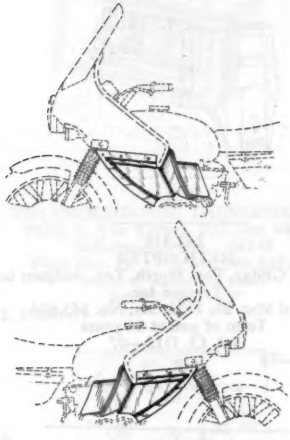


242,338
HELICOPTER
John F. Gilday, Fort Worth, Tex., assignor to Textron Inc.
Filed Mar. 26, 1973, Ser. No. 343,624
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—73

242,339
MOTORCYCLE FAIRING
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., Rantoul, Ill.
Continuation-in-part of design application Ser. No. 561,548, Mar. 24, 1975. This application May 6, 1975, Ser. No. 575,045
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

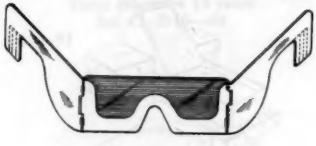


242,340
PAIR OF MOTORCYCLE FAIRING ATTACHMENTS
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., Rantoul, Ill.
Filed Mar. 24, 1975, Ser. No. 561,548
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

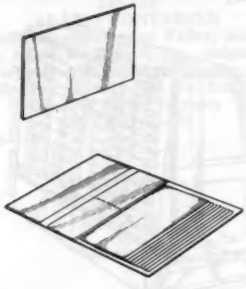


242,341
AUTOMOBILE MIRROR
Leonard Frank Lukey, 236 Chesterville Road, Moorabbin, Victoria 3189, Australia
Filed Mar. 3, 1975, Ser. No. 554,772
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187

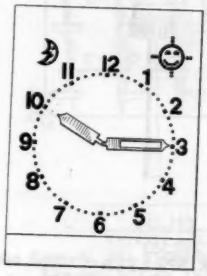
242,342
SUNGLASSES
Alexander Derkas, Phoenixville, Pa., assignor to American Polarizers, Inc., Reading, Pa.
Filed Apr. 4, 1975, Ser. No. 565,047
Term of patent 14 years
Int. Cl. D2—*03*; D16—*06*
U.S. Cl. D16—70



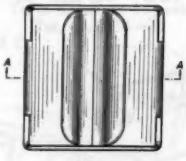
242,343
STATIONERY FOLDER
Keith Royal Testro and Rex Clifford Testro, both of 222 Queen St., Melbourne, Victoria, Australia
Filed Apr. 17, 1974, Ser. No. 461,710
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26



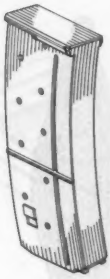
242,344
SIMULATED CLOCK TEACHING AID OR SIMILAR ARTICLE
Ralph T. Klepsch, 307 Lansdown Ave., Carle Place, N.Y. 11514
Filed Mar. 18, 1975, Ser. No. 559,550
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—64



242,345
DESK LETTER RACK
Chuzo Mori, Tokyo, Japan, assignor to Carl Manufacturing Co., Ltd., Tokyo, Japan
Filed Jan. 29, 1975, Ser. No. 545,144
Claims priority, application Japan Aug. 23, 1974
Term of patent 7 years
Int. Cl. D19—*02*
U.S. Cl. D19—90



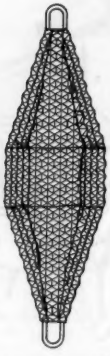
242,346
CARTRIDGE MAGAZINE
Jacob Sofinowski III, Baldwin, and Nicholas J. LaCosta, Phoenix, Md.
Filed Dec. 3, 1975, Ser. No. 637,347
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—7



242,347
FISHING LURE
Robert G. Carver, P.O. Box 44, Athens, La. 71003
Filed Apr. 7, 1975, Ser. No. 565,587
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

242,348
FISHING LURE
Robert G. Carver, P.O. Box 44, Athens, La. 71003
Filed May 22, 1975, Ser. No. 579,924
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

242,349
FISHING LURE
Michael J. Pitrola, 2547 Merritt Ave., San Pablo, Calif. 94806
Filed Apr. 8, 1976, Ser. No. 674,921
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

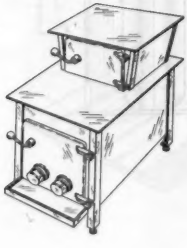


242,350
VALVE
Wesley Kann, 2 Cardinal Lane, Spring Valley, N.Y. 10977
Filed Aug. 25, 1975, Ser. No. 607,271
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

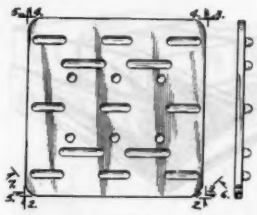
242,351
SPRAYER
Tetsuya Tada, 1339 Nishi Takadomari, Onoda-shi, Yamaguchi-ken, Japan
Filed Jan. 2, 1975, Ser. No. 538,122
Claims priority, application Japan Sept. 4, 1974
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17

242,352
SINK SPRAYER
Tim M. Uyeda, South San Gabriel, Calif., assignor to Chicago Specialty Manufacturing Co., Skokie, Ill.
Filed Feb. 19, 1976, Ser. No. 659,204
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

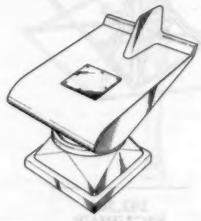
242,353
COMBINED HEATING AND COOKING STOVE
George P. Schrader, Springfield, Oreg., assignor of a fractional part interest to Charles I. Schrader, Springfield, Oreg.
Filed Nov. 17, 1975, Ser. No. 632,297
Term of patent 14 years
Int. Cl. D7—*02*; D23—*02*
U.S. Cl. D23—72



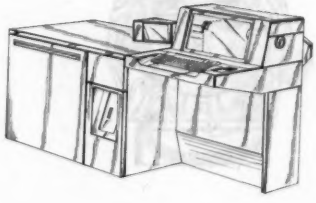
242,354
SOLAR HEAT STORAGE TRAY
James L. Schoenfelder, Iowa City, Iowa, and John H. McLaughlin, Elkhorn, Nebr., assignors to Solar, Inc., Mead, Nebr.
Filed Mar. 22, 1976, Ser. No. 669,191
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



242,355
VENTILATOR
Daisuke Kumada, 501 Kyobashi-Haitsu, 15 Gamou, 3-chome, Joto-ku, Osaka, Japan
Filed Aug. 1, 1975, Ser. No. 600,969
Claims priority, application Japan Feb. 17, 1975
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—153

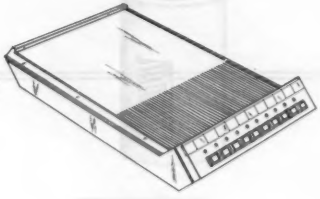


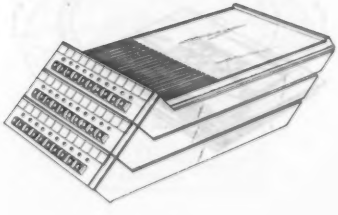
242,356
DATA PROCESSOR
Wayne L. Aderman, Zumbro Falls, and Frank Wilkey, Jr., Rochester, Minn., assignors to International Business Machines Corp., Armonk, N.Y.
Filed Dec. 24, 1974, Ser. No. 536,078
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



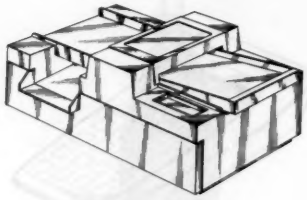
242,357
CASING FOR AN ELECTRONIC CALCULATOR
Charles W. Kellstedt, Jr., Sudbury, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Mar. 21, 1975, Ser. No. 560,970
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

242,358
TELEPHONE KEY BASE
Carl-Arne Breger, Stockholm, Sweden, assignor to Telefonaktiebolaget L M Erickson, Stockholm, Sweden
Filed Aug. 21, 1974, Ser. No. 499,266
Claims priority, application Sweden Mar. 1, 1974
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A





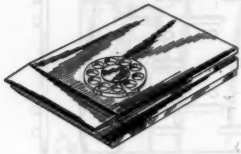
242,359
FACSIMILE TRANSCEIVER
John W. Bruce, Wilton, Conn., assignor to Graphic Sciences, Inc., Danbury, Conn.
Filed May 5, 1975, Ser. No. 574,207
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D26—14 R



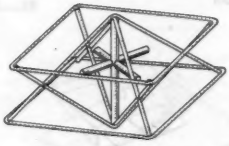
242,360
COMBINATION TAPE STORAGE AND SPEAKER ENCLOSURE
Fred C. Kossen, Jr., 1211 N. Siesta, Anaheim, Calif.
Filed Oct. 14, 1975, Ser. No. 621,942
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

242,361
SPEAKER TELEPHONE
James William Crimmins, Wilton, Conn., assignor to Data Transmission Sciences, Inc., Ridgefield, Conn.
Original design application Nov. 9, 1973, Ser. No. 414,219. Divided and this application Sept. 19, 1975, Ser. No. 614,833
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

242,362
SPEAKER TELEPHONE
James William Crimmins, Wilton, Conn., assignor to Data Transmission Sciences, Inc., Ridgefield, Conn.
Original design application Nov. 9, 1973, Ser. No. 414,219. Divided and this application Sept. 19, 1975, Ser. No. 615,181
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

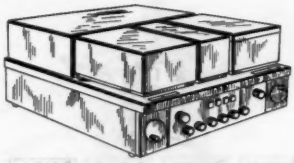


242,363
RELIGIOUS ORNAMENT
Joseph De Sena, 28—07 21st Ave., Astoria, N.Y. 20853
Filed June 16, 1975, Ser. No. 586,972
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—125



242,364
FIGURINE
Suzan G. Pollack, Beverly Wood, Calif., assignor of a fractional part interest to Jules Pollach
Filed June 4, 1975, Ser. No. 583,583
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160

242,365
SPECTROPHOTOFLUOROMETER OR THE LIKE
James G. Bruni, Manhattan Beach, and Stephen G. Hauser, Tarzana, Calif., assignors to Baxter Laboratories, Inc.
Filed June 20, 1975, Ser. No. 588,748
Term of patent 7 years
Int. Cl. D10—*04*; D24—*02*
U.S. Cl. D32—2 C



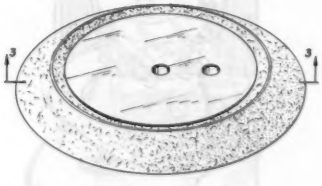
242,366
DOLL
Naomi Ruth Mezebish, 13510 Crispin Way, Rockville, Md. 20853
Filed Jan. 29, 1975, Ser. No. 545,182
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 C

242,367
GLOVE PUPPET
Shirley Gabrielle Clarkson, Doncaster, England, assignor to Gabrielle Designs Limited
Filed Mar. 25, 1975, Ser. No. 561,892
Claims priority, application Great Britain Sept. 27, 1974
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

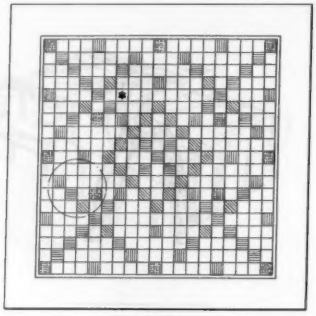
242,368
TOY GIRAFFE FIGURE
Alfons Adriaan den Ouden, Antwerp, Belgium, assignor to Brabo Corporation S.A.N.V.
Filed Mar. 26, 1975, Ser. No. 562,163
Claims priority, application Great Britain Oct. 1, 1974
Term of patent 14 years
Int. Cl. D21— *01*
U.S. Cl. D34—2 R

242,369
JACK STRAW
Reet Thomas Jr., St. Louis, Mo., assignor to Steven Manufacturing Company, Hermann, Mo.
Filed Oct. 29, 1973, Ser. No. 410,624
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP

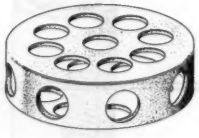
242,370
GOLF GAME TARGET
Otto G. Arndt and James J. Arndt, both of 1708 S. Dahlia St., Denver, Colo. 80222
Filed Sept. 6, 1974, Ser. No. 503,971
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 NN



242,371
GAME BOARD
Edward Maurice Gold, Regent Bldg., Corner of Manners & Lombard Sts., Wellington, New Zealand
Filed Oct. 11, 1974, Ser. No. 514,321
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



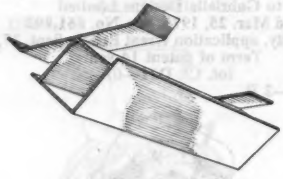
242,372
PRACTICE PUCK
Albert Marcucci, 1493 Kenmuir Ave., L5G 4B6 Mississauga, Ontario, Canada
Filed May 2, 1975, Ser. No. 573,841
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GP



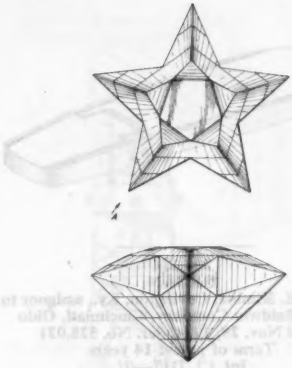
242,373
DOLL
Gordon Haas and Roberta Haas, both of P.O. Box 237, Haena, Hawaii
Filed June 14, 1974, Ser. No. 479,424
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

242,374
DECK OF PLAYING CARDS
Janis Lee Holt and Elzie E. Holt, Lake Hughes, Calif.
Filed Apr. 15, 1974, Ser. No. 461,162
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 R

242,375
KITE
Bernard R. Barrett, 308 W. Graham St., Lombard, Ill. 60148
Filed Mar. 26, 1975, Ser. No. 562,170
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AF

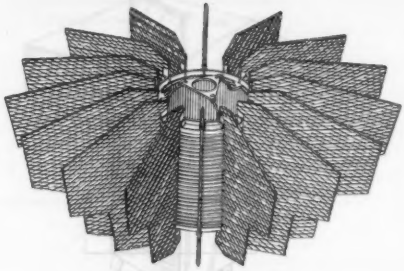


242,376
DIAMOND CUT IN STARFORM
George Saltzman, Arenbergstraat 40, 2000 Anvers, Belgium
Filed Dec. 18, 1974, Ser. No. 533,821
Claims priority, application Belgium July 30, 1974
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—90

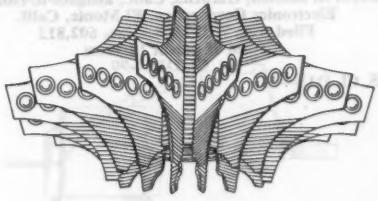


242,377
RING
Jan Meyer, 3420 Mount Diablo Blvd., Lafayette, Calif. 94549
Filed Dec. 20, 1974, Ser. No. 534,998
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—29

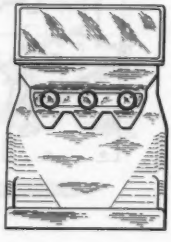
242,378
LAMP SHADE
Jhi Hung Leung, Kowloon, Hong Kong, assignor to Star Industrial Co., Ltd., Kowloon, Hong Kong
Filed Oct. 23, 1974, Ser. No. 517,439
Claims priority, application Great Britain Aug. 5, 1976
Term of patent 7 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 D



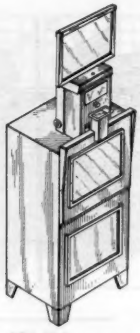
242,379
LAMP SHADE
Jhi Hung Leung, Kowloon, Hong Kong, assignor to Star Industrial Co., Ltd., Kowloon, Hong Kong
Filed Oct. 23, 1974, Ser. No. 517,440
Claims priority, application Great Britain Aug. 5, 1974
Term of patent 7 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 D



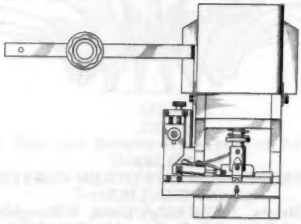
242,380
DISPENSER FOR POWDERED COFFEE OR THE LIKE
Daniel L. Struna, 36624 Ridge Road, Willoughby, Ohio 44094, and Edward J. Szalkowski, 1722 Dunbar Road, North Madison, Ohio 44057
Filed Apr. 1, 1975, Ser. No. 564,055
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D52—2 R

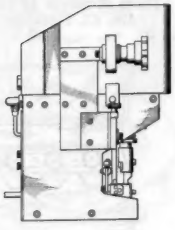


242,381
NEWSPAPER VENDING MACHINE
Jacob Burck, 921 Castlewood Terrace, Chicago, Ill. 60640
Filed Jan. 6, 1975, Ser. No. 538,547
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R

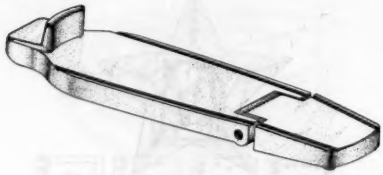


242,382
CRIMPING PRESS
Vincent R. Bennett, Gardena, Calif., assignor to Hoffman Electronics Corporation, El Monte, Calif.
Filed Aug. 7, 1975, Ser. No. 602,813
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—123

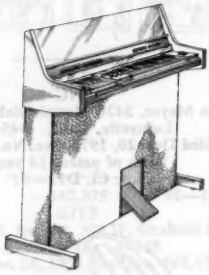




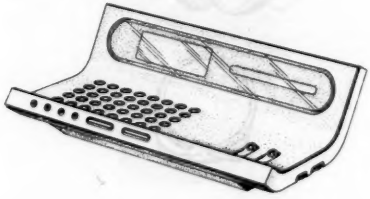
242,383
FOOTBOARD FOR PEDAL-OPERATED PERCUSSIVE MUSICAL INSTRUMENTS
Forrest W. Clark, Jr., Fountain Valley, Calif., assignor to CBS Inc., New York, N.Y.
Filed Oct. 29, 1974, Ser. No. 518,349
Term of patent 14 years
Int Cl. D17—*04*
U.S. Cl. D56—1 E



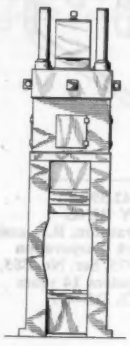
242,384
ORGAN
Thomas E. Kimble, Covington, Ky., assignor to D. H. Baldwin Company, Cincinnati, Ohio
Filed Nov. 29, 1974, Ser. No. 528,021
Term of patent 14 years
Int. Cl. D17—*01*
U.S. Cl. D56—2



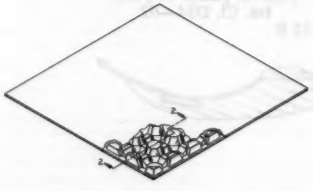
242,385
DIGITAL CLOCK RADIO
Masanori Hamada, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan
Filed Dec. 30, 1974, Ser. No. 537,509
Claims priority, application Japan July 3, 1974
Term of patent 14 years
Int. Cl. D10—*01*; D14—*03*
U.S. Cl. D56—4 B



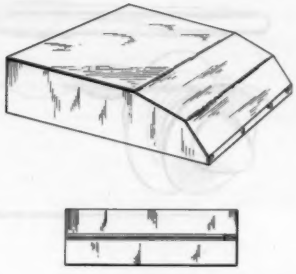
242,386
FORGING PRESS
Louis F. Carrieri, La Grange Park, and Edwin A. Spanke, Oak Forest, Ill., assignors to Gulf & Western Manufacturing Company, New York, N.Y.
Filed June 9, 1975, Ser. No. 585,201
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123



242,387
PLASTIC FREEZER SPACER
Raymond E. Sullivan, Wichita, Kans., assignor to SFB Plastics, Inc.
Filed July 26, 1973, Ser. No. 382,825
Term of patent 14 years
Int. Cl. D9—*03*; D15—*07*
U.S. Cl. D15—89

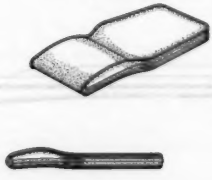


242,388
THERAPEUTIC CUSHION
Jesse W. Castleberry, 442 N. Dillard St., Winter Garden, Fla. 32787
Filed May 29, 1974, Ser. No. 474,449
Term of patent 14 years
Int. Cl. D6—*09*; D24—*99*
U.S. Cl. D83—1 V

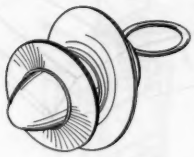


242,389
LEG ELEVATING ATTACHMENT FOR SURGICAL OPERATING TABLE
Jack Bauman, Santa Monica, Calif. (1502 San Remo Drive, Pacific Palisades, Calif. 92104)
Filed July 10, 1975, Ser. No. 594,728
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 D

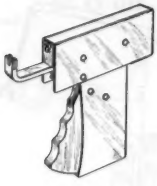
242,390
BACK MASSAGER
Clifford E. Grube, Niles, Ill., assignor to Associated Mills, Inc.
Filed Sept. 2, 1975, Ser. No. 609,502
Term of patent 14 years
Int. Cl. D6—*09*; D28—*03*
U.S. Cl. D83—1 S



242,391
RECTAL RETENTION CATHETER
Frank J. Nightingale, 3791 32nd St., San Diego, Calif. 92104
Filed Feb. 6, 1975, Ser. No. 547,481
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—12 A



242,392
EAR LOBE PIERCING DEVICE
Larry D. Moore, Attleboro, Isaiah W. Johnson, Greensboro, and Charley L. Thompson, Jr., McLeansville, N.C., assignors to Concept Marketing, Inc., Attleboro, Mass.
Filed May 5, 1975, Ser. No. 574,646
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R



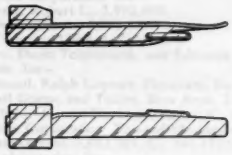
242,393
DISPOSABLE COVER FOR LARYNGOSCOPE
Jack Bauman, Santa Monica, Calif.
(1502 San Remo Drive, Pacific Palisades, Calif. 90272)
Filed June 2, 1975, Ser. No. 582,849
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

242,394
TRAVELING BAG
Thomas D. Tweedie, Monrovia, Calif., assignor to Samsonite Corporation, Denver, Colo.
Filed Dec. 2, 1974, Ser. No. 528,683
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G

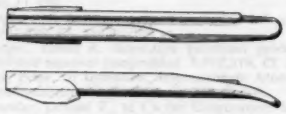
242,395
KEY RING
Samuel J. Bellin, Cranston, R.I., assignor to Crownmark Corporation
Filed June 9, 1975, Ser. No. 585,333
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8

242,396
DISPOSABLE COVER FOR LARYNGOSCOPE
Jack Bauman, Santa Monica, Calif.
(1502 San Remo Drive, Pacific Palisades, Calif. 90272)
Filed May 15, 1975, Ser. No. 577,945
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

242,397
DISPOSABLE COVER FOR LARYNGOSCOPE
Jack Bauman, Santa Monica, Calif.
(1502 San Remo Drive, Pacific Palisades, Calif. 90272)
Filed May 27, 1975, Ser. No. 580,696
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R



242,398
DISPOSABLE COVER FOR LARYNGOSCOPE
Jack Bauman, Santa Monica, Calif.
(1502 San Remo Drive, Pacific Palisades, Calif. 90272)
Filed June 2, 1975, Ser. No. 582,850
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF NOVEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.B.C. Auto Alarms, Inc.: *See—*
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A. Knag. A/S: *See—*
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A. O. Smith Corporation: *See—*
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AB Bofors: *See—*
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Abbas, Shakir A.; and Dockerty, Robert C., to International Business Machines Corporation. Non-volatile memory cell and array using substrate current. 3,992,701, Cl. 340-173.00R.

Abbott Laboratories: *See—*
Prasad, Raj Nandan; Stein, Herman Hal; and Tietje, Karin Rosemarie, 3,992,531.

Abe, Fumiyuki; and Fukuda, Shigeo, to Nissan Motor Co., Ltd. Child restraining seat. 3,992,028, Cl. 280-728.000.

Abe, Koichi: *See—*
Kadowaki, Takashi; Iwasaki, Takao; Matsumura, Hideki; and Abe, Koichi, 3,992,461.

Abell, Irwin R., to Temp-Rite, Inc. Storm window construction. 3,991,806, Cl. 160-90.000.

Acker, William F., to Honeywell Inc. Receiver equalizer apparatus. 3,992,616, Cl. 235-156.000.

Acme Marls Limited: *See—*
Lovatt, William John, 3,992,139.

Acord, Timothy T., to United States of America, Army. Solenoid controlled cold head for a cryogenic cooler. 3,991,586, Cl. 62-6.000.

Active Enterprises, Inc.: *See—*
Jessee, Karl E., 3,992,011.

Adams, Anthony J.: *See—*
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Adcock, Kenneth E. Controlled-distortion photocopying apparatus. 3,992,094, Cl. 355-84.000.

Addressograph Multigraph Corporation: *See—*
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, 3,991,497.

Adler, Meryle D. W.; and Brown, John T., to Corning Glass Works. Sensing element for flow meter. 3,991,613, Cl. 73-194.0VS.

Adler, Stanford L., to Technicon Instruments Corporation. Apparatus for preparing smears of biological liquids. 3,991,705, Cl. 118-7.000.

Adrion, Robert F., to Corning Glass Works. Attenuating image extender for multiple imaging system. 3,992,112, Cl. 356-201.000.

Afton Incorporated: *See—*
Welsh, Richard Francis; Beer, Philip James; and Hazleton, Quinten La Marr, 3,992,598.

AGA Aktiebolag: *See—*
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Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
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Agency of Industrial Science & Technology: *See—*
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Aguilera, John A.: *See—*
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Aihara, Hisanao: *See—*
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Air Power Systems Company, Inc.: *See—*
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Air Products and Chemicals, Inc.: *See—*
Erby, William A.; and Walde, Robert A., 3,992,415.

Airwick Industries, Inc.: *See—*
Denissenko, Serge; and Dazzi, Joachim, 3,992,335.

Aizawa, Susumu; Futagawa, Yoshikiyo; and Kuriya, Katsumi, to Kabushiki Kaisha Suwa Seikosha; and Shinshu Seiki Kabushiki Kaisha. Dynamically driven printer. 3,991,671, Cl. 101-93.040.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. AC feed control system. 3,992,657, Cl. 318-227.000.

Akashi, Shunji, to Yoshida Kogyo Kabushiki Kaisha. Slider for sliding clasp fastener. 3,991,447, Cl. 24-205.14R.

Aktay, Ali I.; and Holowaty, Michael O., to Inland Steel Company. Recovery of coal fines from preheater. 3,992,266, Cl. 201-8.000.

Akzona Incorporated: *See—*
Hunsicker, William R., 3,992,588.

Al, Rene Jan, to Dresser Industries, Inc. Electrically conductive pipe coupling. 3,992,568, Cl. 174-84.00S.

Aladdin Manufacturing Company: *See—*
Hedlund, Harland R.; and Wethe, Harry K., 3,991,522.

Albers, Frederic L. Device for teaching skiing. 3,992,022, Cl. 280-11.37E.

Albright, Alva Z. Apparatus and method of felling and bunching trees. 3,991,799, Cl. 144-34.00R.

Alburger, James R. Inspection penetrant process using solvency-inhibited remover composition. 3,992,319, Cl. 252-408.000.

Albus, Peter, to Interatom, Internationale Atomreaktorbau GmbH. Pipe installation. 3,991,959, Cl. 248-49.000.

Alexander, Donald E., to Carrier Corporation. Support member for electric heating assembly and method of manufacturing. 3,992,609, Cl. 219-532.000.

Alfa-Laval AB: *See—*
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Allison, William D., to Ford Motor Company. Interconnected suspension for a motor vehicle. 3,992,026, Cl. 280-104.000.

Allison, William D., to Ford Motor Company. Independent front suspension system for a motor vehicle. 3,992,036, Cl. 280-695.000.

Allmanna Svenska Elektriska Aktiebolaget: *See—*
Andersson, Conny; Folgero, Kare; Fredriksson, Bengt; Hedberg, Birger; Steinarson, Steinar; and Oberg, Karl-Erik, 3,991,813.
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Altenburger, Otto, to Stromberg-Carlson Corporation. Scanner-marker arrangement for telephone system. 3,992,592, Cl. 179-18.0FF.

Altman, Hugo; and Ryan, Patrick L., to Fullerton Metals Co. Shim strip inserter for slitting and re-rolling machine. 3,991,952, Cl. 242-56.900.

Alto Corporation: *See—*
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Kraft, Paul; and Altscher, Siegfried, 3,992,482.

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Amano, Yoshifumi; and Shionoya, Toshio, to Sony Corporation. Video display system. 3,992,577, Cl. 178-7.30D.

Amax Inc.: *See—*
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Amburn, Raymond D. Method of magnetically treating eggs and animal semen. 3,991,714, Cl. 119-1.000.

Amchem Products, Inc.: *See—*
Anderson, James Douglas; Hayman, Edgar S., Jr.; and Rodzewich, Edward A., 3,992,313.

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Anderson, Clayton & Co.: *See—*
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Anderson, James Douglas; Hayman, Edgar S., Jr.; and Rodzewich, Edward A., to Amchem Products, Inc. Acid inhibitor composition and process in hydrofluoric acid chemical cleaning. 3,992,313, Cl. 252-149.000.

Anderson, Thomas Alexander, to Westinghouse Brake & Signal Company Limited. Encapsulated semiconductor devices. 3,991,461, Cl. 29-588.000.

Andersson, Conny; Folgero, Kare; Fredriksson, Bengt; Hedberg, Birger; Steinarson, Steinar; and Oberg, Karl-Erik, to Allmanna Svenska Elektriska Aktiebolaget. Melt casting apparatus. 3,991,813, Cl. 164-259.000.

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Ando, Ryo, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for the continuous refining of iron and alloys. 3,992,196, Cl. 75-61.000.

Andre, Jacques Maurice Jules Ghislain; Cahen, Raymond Marc; Debus, Henri Robert; Lammers, Rene Odon; and Van Thillo, Hugo Johannes, to Labofina S.A. Process for the preparation of catalysts for the hydrotreatment of petroleum fractions. 3,992,324, Cl. 252-439.000.

Andre, Jacques Maurice Jules Ghislain: *See—*
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Anheuser-Busch, Incorporated: *See—*
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Anthony, Andrew James; and Hutchinson, John Jefferson, to Combustion Engineering, Inc. Fuel assembly for a nuclear reactor. 3,992,259, Cl. 176-78.000.

Antonevich, John N., to Blackstone Corporation. Methods and apparatus for soldering. 3,991,933, Cl. 228-110.000.

Antonini, Albert; Kaziz, Claude; and Wetroff, Georges, to Produits Chimiques Pechiney-Saint Gobain. 1,1,2,2-Tetrachloroethane prepared by oxychlorination of dichloroethylenes. 3,992,462, Cl. 260-658.00R.

Antos, George, to Universal Oil Products Company. Hydrocarbon conversion process. 3,992,268, Cl. 204-72.000.

Antosiak, Jerzy, to Osrodek Badawczo-Rozwojovy Obrobky Plastycznej Metali "Plasomet". Disc type press with hydrostatic bearings. 3,991,681, Cl. 100-257.000.

Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, to Sankyo Company Limited. Antibiotic substances B-41, their production and their use as insecticides and acaricides. 3,992,527, Cl. 424-122.000.

Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, to Sankyo Company Limited. Antisiotic substances B-41, their production and their use as insecticides acaricides. 3,992,551, Cl. 424-283.000.

Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, to Sankyo Company Limited. Antibiotic substance B-41, their production and their use as insecticides and acaricides. 3,992,552, Cl. 424-283.000.

Aoki, Shigemitsu, to Yamaha, Hatsudoki Kabushiki Kaisha. Hull of a small-sized ship. 3,991,696, Cl. 114-56.000.

Aoki, Takao: *See—*
Kubo, Shunichi; Aoki, Takao; Kondo, Eiichi; and Inoue, Shunzo, 3,992,557.

Apostoles, John L.: *See—*
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Appel, Marvin: *See—*
Ogren, John R.; Rutkowski, Eugene V.; and Appel, Marvin, 3,992,685.

Appleford, David Dale; and King, David Philip, to Monsanto Chemicals Limited. Apparatus for measuring specific gravity. 3,991,619, Cl. 73-437.000.

Appleton Electric Company: *See—*
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Applications Mecaniques et Robinetterie A.M.R.I.: *See—*
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Arai, Haruhiko: *See—*
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Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See—*
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Arbrook, Inc.: *See—*
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Archibald, John Leheup; and Heatherington, Kenneth, to John Wyeth & Brother Limited. Tetrahydro-pyrrolo[3,2-c]pyridine derivatives. 3,992,544, Cl. 424-263.000.

Archibald, John Leheup: *See—*
Cavalla, John Frederick; and Archibald, John Leheup, 3,992,389.

Archibald Kenrick and Sons Limited: *See—*
Hamblin, Richard David, 3,991,934.

Arimoto, Kunio: *See—*
Ishigami, Masahisa; Arimoto, Kunio; Inoue, Yoshikazu; and Fujii, Ryoichi, 3,992,510.

Ariyoshi, Junji; and Kariya, Noboru, to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha; and Nard Institute, Ltd. Novel resins. 3,992,433, Cl. 260-468.00G.

Armbruster, Joseph M. Rotatable vehicle wheel support for spin balancer. 3,991,621, Cl. 73-479.000.

Arnstadt, Hartmut: *See—*
Horhold, Hans-Heinrich; Gottschaldt, Joachim; Bergmann, Regina; Opfermann, Johannes; Seliger, Walter; Augst, Siegfried; and Arnstadt, Hartmut, 3,992,203.

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Arutt, Kennuth; and Hall, William, to Cosmos Electronic Machine Corporation. Portable heat sealer. 3,992,606, Cl. 219-243.000.

Asahi, Akira: *See—*
Kageyama, Osamu; Kai, Manabu; Mitani, Tadayuki; Asahi, Akira; and Sasaki, Sadao, 3,992,442.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
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Asai, Sigeru: *See—*
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Asano, Yoichiro: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 3,992,230.

Ashton, Richard F., to Reynolds Metals Company. Resistance welding apparatus and method. 3,992,602, Cl. 219-91.000.

Asmus, Carl Junior; and Wickersham, Woodrow Christman, to Clayton Manufacturing Company. Brake testing apparatus and method incorporating hydraulic position-sensitive subsystem. 3,991,609, Cl. 73-132.000.

Aspro, Incorporated: *See—*
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Astec Industries, Inc.: *See—*
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Atkins, Kenneth Earl; Manyik, Robert Michael; and O'Connor, George Lawrence, to Union Carbide Corporation. Synthesis of alkadienols. 3,992,456, Cl. 260-632.00R.

Atlantic Richfield Company: *See—*
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Zehner, Lee R., 3,992,436.

Atomic Energy of Canada Limited: *See—*
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Auer, John H., Jr.: *See—*
Sibley, Henry C.; Auer, John H., Jr.; and Smith, Willis R., 3,991,958.

Auerbach, Victor, to RCA Corporation. Error cancelling scanning optical angle measurement system. 3,992,106, Cl. 356-141.000.

Augst, Siegfried: *See—*
Horhold, Hans-Heinrich; Gottschaldt, Joachim; Bergmann, Regina; Opfermann, Johannes; Seliger, Walter; Augst, Siegfried; and Arnstadt, Hartmut, 3,992,203.

Augurt, Thomas A., to Propper Manufacturing Company, Inc. Sterile pack. 3,991,881, Cl. 206-439.000.

Ausnit, Steven. Plastic fasteners with connecting web. 3,991,801, Cl. 150-3.000.

Austrins, Andrievs; and Leo, Daniel A., to Anderson, Clayton & Co. Package for non-round bottles. 3,991,880, Cl. 206-431.000.

Avery, Leslie Ronald, to RCA Corporation. Drive pulse generator for a television deflection circuit. 3,992,648, Cl. 315-387.000.

Avison, Gerald: *See—*
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B. F. Goodrich Company, The: *See—*
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Bach, Nicholas J.; and Kornfeld, Edmund C., to Eli Lilly and Company. 2,3-Dihydroergolines. 3,992,385, Cl. 260-285.500.

Backteman, Hans Ulrick. Spreader frame. 3,992,050, Cl. 294-81.0SF.

Bacskai, Robert, to Chevron Research Company. Process for preparing aromatic isocyanates. 3,992,430, Cl. 260-453.00P.

Badachhape, Ramachandra Brijlal: *See—*
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Bahry, Abraham; and Dolev, Moshe. Locking arrangement for doors and the like. 3,991,595, Cl. 70-120.000.

Baikoff, Eugene M. A. Comminuting apparatus. 3,991,944, Cl. 241-36.000.

Bailey, Donald Leroy: *See—*
Johnson, Gordon Carlton; Metzler, Richard Bruce; and Bailey, Donald Leroy, 3,992,426.

Bailey, Edward A.; and Fish, Walter D., to Joy Manufacturing Company. Pneumatic rock drill with peripheral piston clearance space. 3,991,835, Cl. 173-134.000.

Bailey and Kimmel, Inc.: *See—*
Bailey, Leo L.; and Kimmel, David R., 3,991,575.

Bailey, Leo L.; and Kimmel, David R., to Bailey and Kimmel, Inc. Method and apparatus for converting heat energy to mechanical energy. 3,991,575, Cl. 60-669.000.

Bailey, Michael S., to Panduit Corporation. Releasable cable tie. 3,991,444, Cl. 24-16.0PB.

Bailey, Nigel Ronald Hassall, to International Computers Limited. Code conversion arrangements for addresses to faulty memory locations. 3,992,702, Cl. 340-173.0BB.

Bainer, David C., to Textron, Inc. Beadless woven stringer for a spiral slide fastener. 3,991,795, Cl. 139-384.00B.

Baird, David Boyd; Fishwick, Brian Ribbons; Barben, Ian Knowles; and Holland, John Murray, deceased (by Holland, Susan, sole administratrix), to Imperial Chemical Industries Limited. Process for manufacturing thiophene derivatives. 3,992,410, Cl. 260-329.00S.

Baker, Don R., to Stauffer Chemical Company. Organotin miticidal and insecticial compounds. 3,992,425, Cl. 260-429.700.

Bakke, Bjorn, to A. Knag. A/S. Window constructions. 3,991,519, Cl. 49-159.000.

Baldock, Peter John, to Imperial Chemical Industries Limited. Slow-release fertilizers. 3,992,184, Cl. 71-62.000.

Baldwin, Leroy A.: *See—*
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Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, to Situmo Holding S.A. Packaging machine. 3,991,540, Cl. 53-59.00R.

Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, to Situno Holding S.A. Automatic feeding device for delivering articles from a magazine to a conveyor. 3,991,909, Cl. 221-214.000.

Ballweber, Dieter: *See—*
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Balzen, Richard T.: *See—*
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Banks, Jon F., to Brown & Williamson Tobacco Corporation. Apparatus for deposition of flavorant vapor on tobacco. 3,991,771, Cl. 131-134.000.

Bannister, Ronald L.: *See—*
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Banz, Derrald M.; and Springer, Robert E., to Decision Data Computer Corporation. Document feed system. 3,991,998, Cl. 271-125.000.

Barben, Ian Knowles: *See—*
Baird, David Boyd; Fishwick, Brian Ribbons; Barben, Ian Knowles; and Holland, John Murray, deceased, 3,992,410.

Barber, Walter W. Paper feed mechanism for offset printer. 3,991,997, Cl. 271-108.000.

Barbour, John B.: *See—*
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Barenyi, Bela; and Renner, Hermann, to Daimler-Benz Aktiengesellschaft. Motor actuated shiftable supplemental bumper. 3,992,047, Cl. 293-9.000.

Bargel, Gunther; Tyslauk, Willy; Unger, Eberhard; and Muller, Wolfgang, to Gewerkschaft Eisenhutte Westfalia. Conveying apparatus. 3,992,060, Cl. 299-67.000.

Barker, George E.; Cohen, Stephen C.; O'Brien, John L.; and Milgrom, Jack, to Van Straaten Chemical Company. Metal cold forming process and lubricant composition therefor. 3,992,303, Cl. 252-37.000.

Barlow, Gordon A., to Marvin Glass & Associates. Competitive ball game apparatus. 3,992,006, Cl. 273-85.00F.

Barnes, Vincent H. Printing screen and tensioning means. 3,991,677, Cl. 101-127.100.

Barneveld, Dirk; and Vermeulen, Gerardus Antonius Wilhelmus, to U.S. Philips Corporation. Method of manufacturing a cathode-ray tube for the display of colored images. 3,992,207, Cl. 96-36.100.

Bart, Philip D. Collapsible organizer receptacle for fishing leader. 3,991,507, Cl. 43-54.50R.

Barth, Wayne E.; and Kuhla, Donald E., to Pfizer Inc. 4-(2-Pyridylamidoethyl)piperidines. 3,992,388, Cl. 260-293.690.

Bartmann, Wilhelm: *See—*
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Bass, Jacob. Anchor holder. 3,991,699, Cl. 114-210.000.

Bass, Larry I., to Pako Corporation. Stripping and transfer roller assembly for sheet film processing. 3,991,996, Cl. 271-80.000.

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Baudouin, Jacques; and Caspar, Jean-Pierre, to Lafarge (Societe Anonyme). Composition of calcium carboaluminates and of tobermorites, process for its manufacture and its application. 3,992,217, Cl. 106-306.000.

Baudouin, Jacques; and Caspar, Jean-Pierre, to Lafarge (Societe Anonyme). Compound of a calcium trisulfoaluminate base, and process for its manufacture. 3,992,220, Cl. 106-306.000.

Bauer, Ignaz: *See—*
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Baugh, John Lindley, to Brown Oil Tools, Inc. Retrievable well packer and anchor with latch release. 3,991,826, Cl. 166-120.000.

Baughcom, Elisha J.; and Lee, Daniel C., Sr. Oil separator device. 3,992,297, Cl. 210-104.000.

Baum, Sidney J.; and Mayr, Anton J., to Foster Grant Co., Inc. Method of and apparatus for treating plastic film. 3,992,141, Cl. 8-4.000.

Bauman, Robert Andrew, to Colgate-Palmolive Company. Quaternary compounds having anti-microbial activity. 3,992,431, Cl. 260-455.00A.

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Bechtold, Leander; and Kartscher, Gunther, to Pro Casa-Gesellschaft, REG. TRUST. Method for charging storage cells or storage batteries. 3,992,658, Cl. 320-20.000.

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Beck, Gilbert: *See—*
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Becker, Otto Alfred. Composite wall element for thermal and acoustic insulation. 3,991,531, Cl. 52-173.00R.

Beckius, Herbert Jean-Pierre; and Goodhart, Richard Bernard, to Alto Corporation. Pan unstacker. 3,991,888, Cl. 214-8.50A.

Beddell, Christopher Raymond; Lowe, Lawrence Alfred; and Wilkinson, Samuel, to Burroughs Wellcome Co. Agonist analogues of luteinizing hormone releasing hormone. 3,992,365, Cl. 260-112.5LH.

Beddome, Robert Arthur, to Union Carbide Corporation. Low temperature refrigeration process for helium or hydrogen mixtures using mixed refrigerant. 3,992,167, Cl. 62-18.000.

Bede, James R. Flight training assembly. 3,991,487, Cl. 35-12.00R.

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Benjamin, John Stanwood: *See—*
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Bennett, Robert R.; and Nosler, John C., to Sun Studs, Inc. Electro-optical ranging system for distance measurements to moving targets. 3,992,615, Cl. 235-151.320.

Bensa, Rene; Monnet, Andre; and Vincent, Gabriel, to Produits Chimiques Ugine Kuhlmann. Process of mixing fillers with polytetrafluorethylene and tetrafluorethylene copolymers. 3,992,350, Cl. 260-33.60F.

Benson, Glenn S. Four-prong putter head support. 3,992,015, Cl. 273-80.200.

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Berggren, Rolf Uno; and Blom, Erik Gustav Birger, to Pettersson, Sven Goran. Apparatus for producing transparency slide units. 3,992,243, Cl. 156-521.000.

Berggren, Torsten Lennart, to Cellwood Machinery AB. Machine for producing wood shavings from chips. 3,991,946, Cl. 241-93.000.

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Bernert, Georg; Kumpfel, Josef; Schneider, Manfred; and Vogel, Wolfgang, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Warp knitting machine. 3,991,593, Cl. 66-85.00A.

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Bittel, Raymond H.; Helm, Harry A.; and Raffensperger, Maurice J., to United States of America, Army. Discrete control correction for synchronizing digital networks. 3,992,580, Cl. 178-69.50R.

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Black, Robert Bruce. Wind-propelled apparatus. 3,991,694, Cl. 114-39.000.

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Blackstone Corporation: *See—*
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Blaisdell, Leonard L.; and Tetreault, Normand E., to GTE Sylvania Incorporated. Bulk electrical surge arrester. 3,992,652, Cl. 317-61.500.

Blake, Jon R.; and Miller, Harold E., to General Mills, Inc. Process for producing low calorie pasta. 3,992,554, Cl. 426-557.000.

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Boge, Dallas F., to Kockum Industries, Inc. Chop saw. 3,991,637, Cl. 83-490.000.

Bohm, Benno; and Velleman, Klaus, to Bayer Aktiengesellschaft. Production of disulfur dichloride. 3,992,509, Cl. 423-469.000.

Bohne, Philip W.; Cuccia, Michael R.; and Moughon, Tom S., Jr., to Kaiser Aluminum & Chemical Corporation. Dry scrubbing tar and fluoride laden gases. 3,992,176, Cl. 55-71.000.

Bohner, Beat; Dawes, Dag; Meyer, Willy; Perchais, Jean; and Fischer, Hanspeter, to Ciba-Geigy Corporation. Process for the production of 1,2,4-triazole derivatives. 3,992,398, Cl. 260-308.00R.

Bohner, Beat; Dawes, Dag; and Meyer, Willy, to Ciba-Geigy Corporation. 1,2,4-Triazolyl-phosphoric and -phosphonic acid esters. 3,992,399, Cl. 260-308.00R.

Bolldorf, Kurt, to Pfaff Industriemaschinen GmbH. Mechanism for adjustably positioning an embroidering frame. 3,991,691, Cl. 112-86.000.

Bolz, Gerhard; and Wierdsdorff, Walter-Wielant, to BASF Aktiengesellschaft. 4-Oxa-5-hydroxypolycycloalkenones-(3). 3,992,416, Cl. 260-343.30R.

Bonafous, Maurice, to Applications Mecaniques et Robinetterie A.M.-R.I. Butterfly valve. 3,991,974, Cl. 251-306.000.

Bonitz, Eckhard, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Vulcanized molding compositions based on bitumen and olefin polymers. 3,992,340, Cl. 260-28.5AS.

Bonitz, Eckhard: *See—*
Sander, Bruno; Bonitz, Eckhard; Berbner, Heinz; and Hoffmann, Manfred, 3,992,344.

Bonnamour, Yves Bernard, to Southwire Company. Casting machine with multi-band positioning device. 3,991,814, Cl. 164-278.000.

Booher, Claude R., Jr.; and Wiley, Elbert H., to Westinghouse Electric Corporation. Stator vane assembly for gas turbines. 3,992,127, Cl. 415-136.000.

Booher, Claude R., Jr.; and Rahaim, Thomas J., to Westinghouse Electric Corporation. Ceramic vane assembly with end cap insulator compound locking junction. 3,992,129, Cl. 415-214.000.

Boots Company Limited, The: *See—*
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Borg-Warner Corporation: *See—*
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Bork, Frank. Anti-pollution attachment to furnace. 3,991,690, Cl. 110-119.000.

Bossert, Friedrich: *See—*
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Botros, Raouf, to American Color & Chemical Corporation. 6-Anilino-1,4,5-trihydroxyanthraquinones. 3,992,421, Cl. 260-377.000.

Bouguyon, Gerard; and Chesnel, Pierre, to Schlumberger Technology Corporation. Well bore perforating apparatus. 3,991,836, Cl. 175-4.600.

Bourgeois, Paul A.: *See—*
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Bouwhuis, Gijsbertus; and Braat, Josephus Johannes Maria, to U.S. Philips Corporation. Opto-electronic system for determining a deviation between the actual position of a radiation-reflecting plane in an optical imaging system and the desired position of said plane. 3,992,574, Cl. 178-6.6DD.

Bouyoucos, John V.; Selsam, Roger L.; and Wilson, Robert O., to Hydroacoustics Inc. Hydroacoustic apparatus and valving mechanisms for use therein. 3,991,655, Cl. 91-276.000.

Box, E. O., Jr.; and Farha, Floyd, Jr., to Phillips Petroleum Company. Polluted water purification. 3,992,295, Cl. 210-63.00R.

Braat, Josephus Johannes Maria: *See—*
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Brack, Alfred, to Bayer Aktiengesellschaft. Cationic dyestuffs. 3,992,405, Cl. 260-326.50B.

Bracke, William J. I.; and Haveaux, Bernard M. J., to Labofina S.A. Process for preparing high-impact vinyl aromatic polymers. 3,992,484, Cl. 260-880.00R.

Braess, Hans-Hermann, to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft. Safety installation for motor vehicles. 3,992,046, Cl. 296-65.00A.

Brand, Uwe: *See—*
Gath, Rudolph Hans; Fuchs, Hugo; Schmitz, Ruediger; Kartte, Klaus; and Brand, Uwe, 3,992,372.

Brandis, Curt, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Movement direction reversal device. 3,991,989, Cl. 267-75.000.

Brannan, James R.: *See—*
Malkin, Irving; and Brannan, James R., 3,992,278.

Brattsand, Ralph Lennart; Ekenstam, Bo Thuresson AF; Claeson, Karl Goran; and Thalen, Bror Arne, to AB Bofors. Compositions and method of treating with component B of stereoisomeric mixtures of 2′-unsymmetrical 16,17-methylenedioxy steriods. 3,992,534, Cl. 424-241.000.

Braun, Martin; and Doolittle, Howard D., to Machlett Laboratories, Incorporated, The. Broad aperture X-ray generator. 3,992,633, Cl. 250-503.000.

Breer, Carl, II. Portable desk device. 3,991,966, Cl. 248-444.000.

Brems, John H.; Stalker, Neil J.; and Ohrnberger, Peter H., to F. Jos. Lamb Company. Safety overload clutch. 3,991,590, Cl. 64-29.000.

Brichard, Jean; and Colery, Jean-Claude, to Interox. Particulate peroxygen compounds. 3,992,317, Cl. 252-186.000.

Bridges, Bobby L. Tree platform. 3,991,853, Cl. 182-187.000.

Bridgestone Tire Company Limited: *See—*
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Yokota, Yasushi; and Tsuji, Hisao, 3,991,802.

Brimer, Claude Morris. Vortical flow exhaust gas reactor. 3,991,567, Cl. 60-303.000.

Brinkmann, Ludwig; and Herwig, Walter, to Hoechst Aktiengesellschaft. Transparent polyamides from 1,3-bis-(aminomethyl)-cyclohexane and aliphatic amino carboxylic acid. 3,992,360, Cl. 260-78.00A.

British Petroleum Company Limited, The: *See—*
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Brock, James Donald; and Mize, Erbie Gail, to Astec Industries, Inc. Superheat apparatus for drying textile products. 3,991,482, Cl. 34-48.000.

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Brooke, Edric Raymond, to Xerox Corporation. Revolving stripper finger. 3,991,999, Cl. 271-174.000.

Brookes, Malcolm J.; Sheridan, James; and Spranger, Douglas M. Ladder aids. 3,991,852, Cl. 182-169.000.

Brown, Henry B.; Cantor, Eugene; DeTolla, Francis L.; and Vollinger, Gary J., to United Technologies Corporation. Turbine cooling. 3,992,126, Cl. 415-115.000.

Brown, John T.: *See—*
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Brown Oil Tools, Inc.: *See—*
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Brown & Root, Inc.: *See—*
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Brown, Russell L. Chair rail. 3,991,537, Cl. 52-717.000.

Brown & Williamson Tobacco Corporation: *See—*
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Rowland, Wallace Loyd, Jr., 3,991,892.

Bruce, David. Animal feeding receptacle. 3,991,719, Cl. 119-61.000.

Brumlik, George C., to Ingrip Fasteners Inc. Cladding elements. 3,991,534, Cl. 52-483.000.

Brummett, Robert E.: *See—*
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Bruning, William E., to OMNI Railway Equipment Limited. Temporary door installation for grain-carrying freight car. 3,991,807, Cl. 160-113.000.

Brunner, Rudolf, to Heilmeier and Weinlein, Fabrik fur Oel-Hydraulik, a KG. Pressure fluid pump. 3,992,133, Cl. 417-366.000.

Brunswick Corporation: *See—*
Retford, David Thomas, 3,992,014.

Bryant, Nelson H.: *See—*
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Bucalo, Louis. Conception-preventing and variable filtering or flow control devices and methods. 3,991,743, Cl. 128-1.00R.

Buchan, William R.: *See—*
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Buchanan, Robert Royce. Kennel, circular facility. 3,991,717, Cl. 119-19.000.

Buchel, Franz, to Hilti Aktiengesellschaft. Movably mounted magazine for feeding fastening elements into a setting gun barrel. 3,991,925, Cl. 227-10.000.

Buchoff, Leonard S.; and Dalamangas, Chris A., to Technical Wire Products, Inc. Multi-conductor probe. 3,992,073, Cl. 339-108.0TP.

Bukac, Zbynek; and Sebenda, Jan, to Ceskoslovenska akademie ved. Method for producing anionic polyamides with chemically bonded dye. 3,992,361, Cl. 260-78.00L.

Burke, Edward F., Jr.: *See—*
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Burke Industries, Inc.: *See—*
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Burke, Norman R.; Kutnewsky, Drace W.; Price, Virgil C.; and Gerber, Dennis H., to Burke Industries, Inc. Reservoir cover and canalizing means. 3,991,900, Cl. 220-219.000.

Burlington Industries, Inc.: *See—*
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Burnham, James A.; and Frey, James O., to Westinghouse Electric Corporation. Method of separating apertured shadow mask flats after annealing. 3,991,450, Cl. 29-17.00A.

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Burroughs Corporation: *See—*
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Burroughs Wellcome Co.: *See—*
Beddell, Christopher Raymond; Lowe, Lawrence Alfred; and Wilkinson, Samuel, 3,992,365.

Bursack, William W., to Honeywell Inc. Test instrument. 3,992,626, Cl. 250-288.000.

Buss, Jack, to Pre-Con, Inc. Saw positioning system for sawmill edger. 3,992,614, Cl. 235-151.100.

Busse, Walter M.: *See—*
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Buxbom, Seymour, to Desert Outdoor Advertising, Inc. Sign post construction. 3,991,532, Cl. 52-297.000.

Byerley, Wilbur M., to Westinghouse Electric Corporation. J tube discharge or feedwater header. 3,991,720, Cl. 122-32.000.

Bytheway, Jay W. Toy exercising device. 3,991,510, Cl. 46-1.00R.

C. Conradty, Firma: *See—*
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Caesar, Arndt Christian: *See—*
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Cahen, Raymond Marc: *See—*
Andre, Jacques Maurice Jules Ghislain; Cahen, Raymond Marc; Debus, Henri Robert; Lammers, Rene Odon; and Van Thillo, Hugo Johannes, 3,992,324.
Van Thillo, Hugo Johannes; Lammers, Rene Odon; Debus, Henri Robert; Cahen, Raymond Marc; and Andre, Jacques Maurice Jules Ghislain, 3,992,321.

Cairns, Robert Lacock; and Benjamin, John Stanwood, to International Nickel Company, Inc., The. Iron-chromium-aluminum alloys with improved high temperature properties. 3,992,161, Cl. 29-182.500.

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Calspan Corporation: *See—*
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Calvert, Rodney K.; and Landrum, Charles Rabun, to Mead Corporation, The. Carton expander. 3,991,660, Cl. 93-53.0SD.

Camp, Stafford V., III, to Southampton Manufacturing Company, Incorporated. Apparatus for continuously manufacturing boards. 3,992,135, Cl. 425-174.200.

Campagnolo, Tullio. Bicycle saddle support. 3,992,054, Cl. 297-195.000.

Campbell, Ian R. Electrical golf club swing monitor. 3,992,012, Cl. 273-186.00R.

Campbell, James W.: *See—*
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Cannarsa, Robert C. Contact washer. 3,992,075, Cl. 339-232.000.

Canning, Tim W., to Singer Company, The. Backplane transmission line system. 3,992,686, Cl. 333-84.00M.

Canon Kabushiki Kaisha: *See—*
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Cardwell, Paul H.; and Kane, William S., to Deepsea Ventures, Inc. Halidation of manganiferous ore to obtain metal values and recovery and recycle of halide values. 3,992,507, Cl. 423-51.000.

Carmichael, John Michael; Heard, Roderick Stacey; Heibein, Harry Parmer; Lowy, John Alfred; and McCornack, Richard William, to International Business Machines Corporation. Ink jet printing system with pedestal synchronization. 3,992,713, Cl. 346-75.000.

Carnahan, Robert D.: *See—*
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Cartmill, William Glenn, to Musgrave, Charles R., III; Jackson, E. L.; and Cartmill, William, part interest to each. Chain saw guard structure. 3,991,470, Cl. 30-382.000.

Carton, Michael L.; Huetsch, Larry C.; and Stearns, George W., to Wagner Electric Corporation. Vehicle brake system. 3,992,064, Cl. 303-7.000.

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Cassidy, Bruce M.; and Hockedy, Raymond S., to International Business Machines Corporation. Unclocked sense ampllifier. 3,992,637, Cl. 307-235.00F.

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Cates, Lindley A., to Research Corporation. Phosphorothioamides. 3,992,373, Cl. 260-239.0EP.

Caughey, Robert A. Self-feeding press for producing strip material. 3,992,242, Cl. 156-289.000.

Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Heterocyclic compounds. 3,992,389, Cl. 260-293.760.

Celanese Corporation: *See—*
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Cellarius, Hans Jorg, deceased: *See—*
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Chandra, Grish; Griffiths, Brian John; and Westall, Stephen, to Dow Corning Limited. Preparation of organosilicon compounds. 3,992,427, Cl. 260-448.20E.

Chanock, Robert M.; and Murphy, Brian R., to United States of America, Health, Education and Welfare. Temperature-sensitive recombinant mutant viruses and a process for producing same. 3,992,522, Cl. 424-89.000.

Chapman, Arthur S., to Hughes Aircraft Company. Telescope cluster. 3,992,629, Cl. 250-338.000.

Charles Machine Works, Inc., The: *See—*
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Chaudhuri, Punya B.; and Norberg, Nils G., to Kamyr A.B. Method for bleaching of high consistency cellulosic pulp. 3,992,250, Cl. 162-88.000.

Chauvette, Robert R.; and Koppel, Gary A., to Eli Lilly and Company. 3-Thio-substituted cephalosporin antibiotics. 3,992,377, Cl. 260-243.00C.

Chemische Werke Huls Aktiengesellschaft: *See—*
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Cherney, Steven D., to Procter & Gamble Company, The. Process for the preparation of spray-dried calcium carbonate-containing granules. 3,992,314, Cl. 252-160.000.

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Chicago Bridge & Iron Company: *See—*
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Chichester, Willard L.; and Hansen, Howard C., to Clark Equipment Company. Power steering system. 3,991,846, Cl. 180-132.000.

Chien, Yie W.; and Lambert, Howard J., to G. D. Searle & Co. Method for making a microsealed delivery device. 3,992,518, Cl. 424-22.000.

Childress, Bruce D., to Jacuzzi Bros. Incorporated. Sump pump system and pressure responsive switch assembly therefor. 3,992,130, Cl. 417-36.000.

Chodil, Gerald J.; DeJule, Michael C.; and Glaser, David, to Zenith Radio Corporation. Cathodoluminescent display with hollow cathodes. 3,992,644, Cl. 313-217.000.

Chomerics, Inc.: *See—*
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Christy, Marcia E., to Merck & Co., Inc. 4-(5H-dibenzo[a,d]cyclohepten-5-ylidene)-1-methylpiperidine-N-oxide isomer. 3,992,547, Cl. 424-267.000.

Chrysler Corporation: *See—*
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Cicero, Edward L. Separating flower pot. 3,991,516, Cl. 47-34.00R.

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Cincinnati Printing and Drying Systems, Inc.: *See—*
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Cirino, John F. Blower equipment for roll-over car wash. 3,991,433, Cl. 15-312.00R.

Claeson, Karl Goran: *See—*
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Clark, Barry Frederick. Drill sampling diversion unit. 3,991,838, Cl. 175-210.000.

Clark, Charles R., to Foster Wheeler Energy Corporation. Separator arrangement for start-up system. 3,992,172, Cl. 55-427.000.

Clark, David William Harold, to May & Baker Limited. Zinc and manganese pigments. 3,992,219, Cl. 106-291.000.

Clark Equipment Company: *See—*
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Clark, Ronald John, to Sealed Motor Construction Co. Ltd. Air conditioning device. 3,991,819, Cl. 165-29.000.

Clarke, Robert L.: *See—*
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Claudel S.A.: *See—*
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Clauss, Manfred, to Clauss-Markisen, Firma. Retractable awning of adjustable angle of inclination. 3,991,805, Cl. 160-22.000.

Clauss-Markisen, Firma: *See—*
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Clay, Rufus G. Geothermal energy recovery. 3,991,817, Cl. 165-1.000.

Clayton Manufacturing Company: *See—*
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Cleary, James W., to Phillips Petroleum Company. Alkali metal hydroxide and phenol sulfonate dyeability additive in polyesterification process. 3,992,359, Cl. 260-75.00S.

Cleary, William T.; and Bourgeois, Paul A. Rudder attachment for outboard motors. 3,991,700, Cl. 115-18.00B.

Clemence, Francois; Deraedt, Roger; Allais, Andre; and Le Martret, Odile, to Roussel-UCLAF. 3-Quinoline-substituted 4-oxycarboxamides. 3,992,540, Cl. 424-258.000.

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Clemmons, Quentin T., to Westinghouse Air Brake Company. Means enabling replacement of worn disc brake shoes without disassembly. 3,991,860, Cl. 188-73.600.

Clinton Industries, Inc.: *See—*
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Clonts, Kenyon E., to Merichem Company. Mass transfer apparatus. 3,992,156, Cl. 23-267.0MS.

Clouthier, Robert G. Decollator for continuous forms. 3,991,993, Cl. 270-52.500.

Cloutier, Maurice P.: *See—*
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Coale, Thomas E.; Gunn, Sidney W.; Merrigan, Frank; and Tompkins, Donald M., to St. Regis Paper Company. Nonfabric engraving blanket. 3,991,673, Cl. 101-395.000.

Cobb, Lucila M.: *See—*
Tidwell, William F.; and Cobb, Lucila M., 3,991,666.

Cocozza, Salvatore. Inhaler for powdered medicaments. 3,991,761, Cl. 128-266.000.

Coffee-Mat Corporation: *See—*
Kull, Leo, 3,991,788.

Cohen, Georges: *See—*
Juguin, Bernard; Cohen, Georges; and Mikitenko, Paul, 3,992,465.

Cohen, Howard. Cricothyrotomy apparatus. 3,991,765, Cl. 128-305.000.

Cohen, Stephen C.: *See—*
Barker, George E.; Cohen, Stephen C.; O'Brien, John L.; and Milgrom, Jack, 3,992,303.

Cohen, Steven H. Stabilizing lines or cables. 3,991,550, Cl. 57-144.000.

Coin Acceptors, Inc.: *See—*
Martin, Bart G., 3,991,867.

Coleman, John Douglas, to Commonwealth Scientific and Industrial Research Organization. Curtain coating apparatus for the manufacture of paperboard. 3,992,252, Cl. 162-266.000.

Colery, Jean-Claude: *See—*
Brichard, Jean; and Colery, Jean-Claude, 3,992,317.

Colgate-Palmolive Company: *See—*
Bauman, Robert Andrew, 3,992,431.

Collins, Stephen: *See—*
De Milt, Kenneth E.; and Collins, Stephen, 3,991,668.

Combustion Engineering, Inc.: *See—*
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Commissariat a l'Energie Atomique: *See—*
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Communication Mfg. Co.: *See—*
Krumbach, Guenter F., 3,992,699.

Compagnie Industrielle des Piles Electriques "Cipel": *See—*
Depoix, Pierre, 3,992,228.

Compur-Werk Gesellschaft mit beschrankter Haftung & Co.: *See—*
Retzer, Erich, 3,992,150.

Constien, Vernon George, to Dow Chemical Company, The. Polycarbonates incorporating 2-methylglycerol residues. 3,992,357, Cl. 260-47.0XA.

Continental Can Company, Inc.: *See—*
Kinnavy, James W., 3,991,915.
Shaw, Fred B., 3,991,543.

Continental Oil Company: *See—*
Maxson, Orwin G.; and Peterson, Marvin L., 3,992,272.
Napier, Donald R.; and Starks, Charles M., 3,992,432.

Cook, Danny G., to Liquid Processing Systems, Inc., a part interest. Method for coalescing oil using a brominated monoolefin resin. 3,992,290, Cl. 210-23.00R.

Cook, Neal A.; Costello, Norman F.; and Granetzke, Dennis C., to Modine Manufacturing Company. Heat exchange system. 3,991,821, Cl. 165-103.000.

Cooke, John; and Alker, Derek, to Gullick Dobson Limited. Self-advancing mine roof supports. 3,991,578, Cl. 61-45.00D.

Cooley, Jack L.: *See—*
Ihrig, David C.; Cooley, Jack L.; and Boex, Michael W., 3,992,491.

Cooper, Phillip Clinton, to Deere & Company. Hydraulically tiltable and anglable dozer blade and mounting therefor. 3,991,832, Cl. 172-804.000.

Coraor, George R.; Jackson, Harold L.; and Mader, Frederick W., to Du Pont de Nemours, E. I., and Company. Process for recovering volatile organic liquids. 3,991,481, Cl. 34-28.000.

Coraor, George R., to Du Pont de Nemours, E. I., and Company. Rapid application and fixation of dye or brightening agent on synthetic polymer. 3,992,145, Cl. 8-174.000.

Corey, Elias J.; Bindra, Jasjit S.; and Schaaf, Thomas K., to Pfizer Inc. Novel prostaglandin intermediates. 3,992,438, Cl. 260-514.00G.

Corey, Elias J.: *See—*
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Corning Glass Works: *See—*
Adler, Meryle D. W.; and Brown, John T., 3,991,613.
Adrion, Robert F., 3,992,112.
Curren, Roger L.; and Reas, Lewis F., 3,991,932.
Eaton, David L.; and Messing, Ralph A., 3,992,329.

Corona, Stephen C.: *See—*
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Corth, Richard, to Westinghouse Electric Corporation. Plant growth type fluorescent lamp. 3,992,646, Cl. 313-487.000.

Cosmos Electronic Machine Corporation: *See—*
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Costello, Matthew J.: *See—*
Rhyins, Richard W.; Rand, Ralph; Costello, Matthew J.; and Krallinger, Robert E., 3,992,623.

Costello, Norman F.: *See—*
Cook, Neal A.; Costello, Norman F.; and Granetzke, Dennis C., 3,991,821.

Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Process for the catalytic hydrodealkylation of alkylaromatic hydrocarbons. 3,992,468, Cl. 260-672.00R.

Cote, Edgar A.: *See—*
Dietz, Russell N.; Cote, Edgar A.; Vogel, William; and Dempsey, John C., 3,991,680.

Cotte, Dietrich; Scheffler, Holger; and Kertzscher, Claus, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Pattern drum for circular knitting machines. 3,991,591, Cl. 66-50.00B.

Cottman, Kirkwood S., to Goodyear Tire & Rubber Company, The. Phenolic antioxidants prepared from a pentacyclo-tetradeca-5,11-diene. 3,992,354, Cl. 260-45.95H.

Coulter, James L.; and Lorenz, Harald H., to General Motors Corporation. Adjusting mechanism for a disc brake caliper assembly. 3,991,859, Cl. 188-71.900.

Council of Livestock Protection, Inc.: *See—*
Giger, Walter, Jr.; and Westervelt, Rudy G., 3,991,438.
Giger, Walter, Jr., 3,991,441.

Courson, Iber C.: *See—*
Kraft, Joseph K.; and Courson, Iber C., 3,991,877.

Coverdale, Charles E.; and Skaletzky, Louis L., to Upjohn Company, The. Quinolylaminobenzoylpiperazine-1-oxides. 3,992,382, Cl. 260-268.0BQ.

Cox, John A., to Caterpillar Tractor Co. Counterweight installation means for loaders and the like. 3,991,891, Cl. 214-142.000.

Cox, Robert E. Railway transportating system and apparatus therefor. 3,991,889, Cl. 214-38.00B.

CPC International Inc.: *See—*
McKague, Allan B.; deWaal, William; and Van Winckel, Carl E., 3,992,452.

Crabtree, Allen, to Imperial Chemical Industries Limited. Diazine dyestuffs. 3,992,381, Cl. 260-256.50R.

Craig, Alan J.; Casey, James H.; and de Neui, Richard P., to Minnesota Mining and Manufacturing Company. Tape applicating and severing assembly. 3,992,244, Cl. 156-521.000.

Crall, Frederick William, to Chrysler Corporation. Noise immune reset circuit for resetting the integrator of an electronic engine spark timing controller. 3,991,730, Cl. 123-117.00R.

Crawley, David F. C., to Boots Company Limited, The. Weighing device. 3,991,841, Cl. 177-225.000.

Crawshay, Richard, to Canadian Mine Services Ltd. Drill head with locking chuck. 3,992,019, Cl. 279-4.000.

Crayton, Bruce E.; and Phillips, Ronald A., to Eastman Kodak Company. Automatic film threading device. 3,991,955, Cl. 242-192.000.

Creusot-Loire: *See—*
Leroy, Pierre; and Bastien, Jean, 3,992,194.

Crickmer, Charles D., to Joy Manufacturing Company. Buoyant counterbalancing for drill string. 3,991,837, Cl. 175-27.000.

Crissman, Robert C.: *See—*
Hughes, Frederick R.; and Crissman, Robert C., 3,992,071.

Crosby, Bing. Window sash holder. 3,991,521, Cl. 49-417.000.

Cross, Shirley. Orange peeler. 3,991,465, Cl. 30-123.700.

Crucible Inc.: *See—*
Chandhok, Vijay K., 3,992,200.
Dulis, Edward J.; Fleck, James N.; and Powell, Joseph W., 3,992,202.

Cryogenic Technology, Inc.: *See—*
Loudon, John D., 3,992,169.

Cubic Corporation: *See—*
Molthen, Edward H., 3,992,691.

Cuccia, Michael R.: *See—*
Bohne, Philip W.; Cuccia, Michael R.; and Moughon, Tom S., Jr., 3,992,176.

Culver, Craig F. Self-contained closure for writing instruments and the like. 3,992,115, Cl. 401-106.000.

Cumbers, David Charles, to Imperial Chemical Industries Limited. Calender presses. 3,991,669, Cl. 100-162.00B.

Curington, Alfred R. Sampling airhammer apparatus. 3,991,834, Cl. 173-73.000.

Curley, James H.: *See—*
Anhalt, John W.; and Curley, James H., 3,992,072.

Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Process for preparing pyridine derivatives. 3,992,383, Cl. 260-283.00S.

Curren, Roger L.; and Reas, Lewis F., to Corning Glass Works. Blanks for forming cartons or the like and resulting cartons. 3,991,932, Cl. 229-35.000.

Curtis Instruments, Inc.: *See—*
Finger, Eugene P., 3,992,667.
Finger, Eugene P., 3,992,668.

Curtiss-Wright Corporation: *See—*
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Cutter Laboratories, Inc.: *See—*
Miller, George E., Jr.; Kahn, Paul; and Dabney, William C., 3,991,767.

Dabney, William C.: *See—*
Miller, George E., Jr.; Kahn, Paul; and Dabney, William C., 3,991,767.

Dades, John Willson, to GTE Automatic Electric Laboratories Incorporated. Radio frequency protection circuit. 3,992,669, Cl. 325-2.000.

Daicel, Ltd.: *See—*
Kageyama, Osamu; Kai, Manabu; Mitani, Tadayuki; Asahi, Akira; and Sasaki, Sadao, 3,992,442.
Kamosaki, Minoru; and Asai, Sigeru, 3,992,478.

Dailey, John Henry: *See—*
Shannon, Joseph W.; Ripley, Clarence A., Jr.; and Dailey, John Henry, 3,991,911.

Daimler-Benz Aktiengesellschaft: *See—*
Barenyi, Bela; and Renner, Hermann, 3,992,047.
Stute, Manfred, 3,992,157.

Dainippon Jochugiku Kabushiki Kaisha: *See—*
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Dainippon Pharmaceutical Co., Ltd.: *See—*
Uno, Hitoshi; Nakano, Junji; and Kadokawa, Toshiaki, 3,992,391.

Daito Seiki Company, Ltd.: *See—*
Sugimoto, Tadahiro, 3,991,644.

Daiwa Boseki Kabushiki Kaisha: *See—*
Tashiro, Ichiro; Motobayashi, Kozo; Kamiya, Kazuo; Yoshizawa, Toshio; and Yamada, Yasuo, 3,991,950.

Dalamangas, Chris A.: *See—*
Buchoff, Leonard S.; and Dalamangas, Chris A., 3,992,073.

Dalzell, Haldean Cloyce: *See—*
Winn, Martin; Razdan, Raj Kumar; Dalzell, Haldean Cloyce; and Krei, Joyce Ruth, 3,992,550.

D'Amico, John J., to Monsanto Company. Dithio and thiol carbamates as plant growth regulants. 3,992,185, Cl. 71-76.000.

D'Amico, John J., to Monsanto Company. N,N'-(O-phenylenedimethylidyne)-bis-substituted anilines. 3,992,191, Cl. 71-121.000.

Dana Corporation: *See—*
Wojcikowski, Richard J., 3,991,789.

Dancy, Edna A.: *See—*
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Danneberg, Peter: *See—*
Mentrup, Anton; Renth, Ernst-Otto; Schromm, Kurt; and Danneberg, Peter, 3,992,537.

Dannels, Bobby F., to Hooker Chemicals & Plastics Corporation. Sensitized production of sulfhydryl compounds using ultra violet radiation. 3,992,274, Cl. 204-158.00R.

Dannels, Bobby F.; and Geering, Emil J., to Hooker Chemicals & Plastics Corporation. Method for production of sulfhydryl compounds using ultra-violet radiation. 3,992,289, Cl. 204-158.00R.

Danzig, Ivan F.; La Conti, Anthony B.; and Amore, Joseph M., to General Electric Company. Method for gas generation. 3,992,271, Cl. 204-129.000.

Dapper, James C.; and Niemi, Paul A., to Cincinnati Electronics Corporation. Scanning optical spectral analyzer employing plural detectors. 3,992,101, Cl. 356-83.000.

Dardi, Louis E.: *See—*
Friedrich, Leonard A.; Rutz, David A.; and Dardi, Louis E., 3,991,928.

Darling, Myron E., to B.J.D. Industries. Method and apparatus for attaching hairs to a bow for a stringed instrument. 3,991,647, Cl. 84-282.000.

Data Packaging Corporation: *See—*
Kaplow, Roy, 3,992,689.

Daum, Sol J.: *See—*
Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., 3,992,437.

David Brown Tractors Limited: *See—*
Dearnley, Kenneth, 3,991,629.

Davidson, Charles Patrick Duncan, to Lucas Electrical Company Limited, The. Cycles. 3,991,843, Cl. 180-33.00C.

Davies, Leslie Llewellyn Rhys. Wind velocity servo system. 3,991,624, Cl. 73-189.000.

Davies, Robert William, to Molins Limited. Packing machines. 3,991,662, Cl. 93-12.00C.

Davis, Eugene Edward; and Miskin, Brian Leslie, to Johnsen & Jorgensen (Plastics) Ltd. Hinged closures. 3,991,904, Cl. 220-334.000.

Davis, George G., to Frigitemp. Acoustical board. 3,991,848, Cl. 181-33.00G.

Davis, Jimmy H.; and Lamberth, Larry E., to Texas Instruments Incorporated. Universal flexible acoustic coupler muff system. 3,992,583, Cl. 179-1.00C.

Davis, Steven S., to Envirotech Corporation. Dewatering machine. 3,992,298, Cl. 210-141.000.

Davis, William W., to Sperry Rand Corporation. Phase locked loop NRZ data repeater. 3,992,581, Cl. 178-70.00R.

Dawes, Dag: *See—*
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Bohner, Beat; Dawes, Dag; and Meyer, Willy, 3,992,399.

Day, Ian; and Greenwood, John Carlton, to Polymark Limited. Heat sealable labels. 3,992,559, Cl. 428-200.000.

Dazzi, Joachim: *See—*
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Dearnley, Kenneth, to David Brown Tractors Limited. Power take-off shaft assemblies. 3,991,629, Cl. 74-15.400.

Dearth, Leonard R.: *See—*
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Debrus, Andre J. M.: *See—*
Plan, Robert A. M.; Liautaud, Jacques C.; Makula, Marie-France; Gattel, Paule A.; Pla, Jean F.; and Debrus, Andre J. M., 3,992,367.

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Van Thillo, Hugo Johannes; Lammers, Rene Odon; Debus, Henri Robert; Cahen, Raymond Marc; and Andre, Jacques Maurice Jules Ghislain, 3,992,321.

Decision Data Computer Corporation: *See—*
Banz, Derrald M.; and Springer, Robert E., 3,991,998.

DeCorso, Serafino M.; and Lin, Shou S., to Westinghouse Electric Corporation. Flexible interconnection for combustors. 3,991,560, Cl. 60-39.320.

Deepsea Ventures, Inc.: *See—*
Cardwell, Paul H.; and Kane, William S., 3,992,507.

Deere & Company: *See—*
Cooper, Phillip Clinton, 3,991,832.

DeFazio, Charles A.: *See—*
Powanda, Thomas M.; Rybny, Charles B.; and DeFazio, Charles A., 3,992,276.

Deffontaine, Pierre, to Mines de Potasse d'Alsace S.A. Self advancing support chocks. 3,991,579, Cl. 61-45.00D.

DeJule, Michael C.: *See—*
Chodil, Gerald J.; DeJule, Michael C.; and Glaser, David, 3,992,644.

Del Tek, Inc.: *See—*
Saurenman, Dean, 3,991,779.

Delagebeaudeuf, Daniel; and Meignant, Didier, to Thomson-CSF. Low-noise thermo-ionic injection diode. 3,992,715, Cl. 357-13.000.

Del Bon, Franco. Automatic closure device for the discharge of a foam product from a pressurized container. 3,991,916, Cl. 222-402.130.

Del Fabbro, Claudio, to Zanussi Grandi Impianti S.p.A. Forced-convection oven. 3,991,737, Cl. 126-21.00A.

Del Fabro, Remigio. Stirrup machine. 3,991,600, Cl. 72-203.000.

DeMaagd, Howard E.; and Sloan, Thomas W., to John Thomas Batts, Inc. Article biasing display rod. 3,991,884, Cl. 211-1.500.

Demarthe, Jean-Michel: *See—*
Lemarinel, Robert; Demarthe, Jean-Michel; and Gandon, Louis, 3,992,270.

De Mets, Albert, to Konstruktiewerkhuize DeMets N.V. Continuously operating prepress or finishing press. 3,992,134, Cl. 425-149.000.

De Milt, Kenneth E.; and Collins, Stephen, to SFM Corporation. Shredder-compactor apparatus for processing refuse material. 3,991,668, Cl. 100-98.00R.
Demo, Joseph J., Jr., to Du Pont de Nemours, E. I., and Company. Ductile chromium-containing ferritic alloys. 3,992,198, Cl. 75-124.000.
Demole, Edouard P., to Firmenich S.A. Flavoring and perfuming ingredients. 3,992,457, Cl. 260-632.00R.
Demole, Edouard P., to Firmenich S.A. Flavoring and perfuming ingredients. 3,992,458, Cl. 260-635.00R.
DeMonsy, Richard L.: *See—*
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Dempsey, John C.: *See—*
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Demuth, Hans, to Sulzer Brothers Limited. Eccentric drive for a dobby. 3,991,793, Cl. 139-79.000.
de Neui, Richard P.: *See—*
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Denissenko, Serge; and Dazzi, Joachim, to Airwick Industries, Inc. Self-shining floor care compositions. 3,992,335, Cl. 260-13.000.
Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Kadowaki, Takashi; Iwasaki, Takao; Matsumura, Hideki; and Abe, Koichi, 3,992,461.
Denzinger, Walter; Hofmann, Ernst; and Herrle, Karl, to BASF Aktiengesellschaft. Manufacture of insoluble and only slightly water-swellable polymers of N-vinyl lactams of improved adsorptivity. 3,992,562, Cl. 526-208.000.
Depoix, Pierre, to Saft-Societe des Accumulateurs Fixes et de Traction; and Compagnie Industrielle des Piles Electriques "Cipel". Electric primary cell comprising a visual indicator of its state of charge. 3,992,228, Cl. 429-90.000.
Deraedt, Roger: *See—*
Clemence, Francois; Deraedt, Roger; Allais, Andre; and Le Martret, Odile, 3,992,540.
Derbyshire, George Cecil, to Jacobs Manufacturing Company Limited, The. Drill chucks. 3,992,020, Cl. 279-16.000.
Derderian, George; Rodemann, Alfred H.; Mohon, Windell N.; and Pease, John W., to United States of America, Navy. Aircraft landing signal officer trainer. 3,991,486, Cl. 35-12.00N.
Derichs, Wilfried: *See—*
Kracke, Jurgen; Miemietz, Hans-Peter; Derichs, Wilfried; Richer, Werner; and Stadelmann, Johann, 3,991,448.
Desert Outdoor Advertising, Inc.: *See—*
Buxbom, Seymour, 3,991,532.
Desouches, Maurice M.; and Le Sech, Alain, to L-Electro-Refractaire. Heterogeneous refractory compounds. 3,992,213, Cl. 106-57.000.
Dessau, Ralph; and Heiba, El-Ahmadi, to Mobil Oil Corporation. Process for manufacture of gamma butyrolactones. 3,992,417, Cl. 260-343.600.
DeTolla, Francis L.: *See—*
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Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Haschke, Heinz; Morlock, Gerhard; Kruger, Horst; and Hebbel, Gerhard, 3,992,343.
Devillers, Julien, to Intercontinental Trading Company - Intraco. Control apparatus for a machine for cutting a workpiece. 3,991,636, Cl. 83-12.000.
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DeWesse, John L., to Westinghouse Electric Corporation. Control rod drive mechanism for a nuclear reactor. 3,992,255, Cl. 176-36.00C.
Dezelan, Joseph E.; and Vinton, David S., to Caterpillar Tractor Co. Combination hydraulic and mechanical suspension system. 3,992,035, Cl. 280-683.000.
Diamond Shamrock Corporation: *See—*
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Malkin, Irving; and Brannan, James R., 3,992,278.
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Diamond, Stephen: *See—*
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Dibb, Douglas N.; and Barbour, John B., to Omni Research Incorporated. Recovery of surface active glycosides. 3,992,315, Cl. 252-182.000.
Dickie, Ray A.; and Cassatta, Joseph C., to Ford Motor Company. Protective coating composition. 3,992,477, Cl. 260-827.000.
DIEHL: *See—*
Rentzsch, Max; and Hofmann, Gunther, 3,991,683.
Diery, Helmut; Frohlich, Horst; Helwerth, Rainer; and Lorke, Horst, to Hoechst Aktiengesellschaft. Metal-working and corrosion protection agent. 3,992,306, Cl. 252-33.600.
Dieterich Standard Corporation: *See—*
Olson, Jack E.; Frey, Lyle D.; and Nevin, Robert S., 3,992,655.
Dietrich, Jurgen; Mracek, Miroslav; Sukatsch, Dieter; and Nesemann, Georg, to Hoechst Aktiengesellschaft. Process for the preparation of moenomycin. 3,992,263, Cl. 195-80.00R.
Dietz, Russell N.; Cote, Edgar A.; Vogel, William; and Dempsey, John C., to United States of America, Energy Research and Development Administration. Tagging explosives with sulfur hexafluoride. 3,991,680, Cl. 102-28.00R.
Diez, Adolf; Stark, Manfred; and Anderko, Kurt, to Karl Schmidt GmbH. Process for manufacturing a light alloy piston having an annular cooling passage in its head portion. 3,991,811, Cl. 164-121.000.
Dill, Frederick H.; Fan, George J.; and Toupin, Richard A., to International Business Machines Corporation. Method and apparatus for recording information on a recording surface. 3,992,712, Cl. 346-1.000.
Dillon, Thomas J., to FCE-Dillon, Inc. Module elevator system for installation in a multi-story building. 3,991,528, Cl. 52-79.000.
Dimitri, Mitchell S., to Westvaco Corporation. Flowable pesticide formulations. 3,992,532, Cl. 424-213.000.
Dionne, Michael. Clothes dryer with anti-static magnet. 3,991,479, Cl. 34-1.000.
Dislich, Marianne: *See—*
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DiStefano, Thomas Herman, to International Business Machines Corporation. Method and apparatus for propagatng potential inversion wells. 3,992,716, Cl. 357-24.000.
Dits, Herbert: *See—*
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Ditzler, Lee C., to Universal Engineered Systems, Inc. Sealed capacitor transducer for fluid flow measurement. 3,991,614, Cl. 73-215.000.
Dix, Malcolm James: *See—*
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Djeu, Nicholas I.; and Burnham, Ralph L., to United States of America, Navy. Optically pumped collision laser in Hg at 546.1 nm. 3,992,683, Cl. 331-94.50G.
Dockerty, Robert C.: *See—*
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Dr. -Ing. H.c.F. Porsche Aktiengesellschaft: *See—*
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Dolev, Moshe: *See—*
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Dombro, Robert A.; Illingworth, George E.; and Fronczak, Richard A., to Universal Oil Products Company. Preparation of polymerization catalyst systems. 3,992,322, Cl. 252-429.00B.
Donath, Ernest E. Process for converting high sulfur coal to low sulfur power plant fuel. 3,991,557, Cl. 60-39.060.
Donini, Pietro, to Istituto Farmacologico Serono S.p.A. Radioimmunoassay method for human chorionic gonadotropin in the presence of luteinizing hormone. 3,992,514, Cl. 424-1.500.
Donoff, Richard C., to Philip Morris Incorporated. Apparatus for use in repairing rolls supporting web material. 3,991,458, Cl. 29-234.000.
Donohue, John A.; Fields, Ellis K.; and Hart, Harold, to Standard Oil Company (Indiana). Process for electrolytic synthesis of polyalkylbiphenylpolycarboxylic acid compounds. 3,992,435, Cl. 260-475.00R.
Doolittle, Howard D.: *See—*
Braun, Martin; and Doolittle, Howard D., 3,992,633.
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., to Hooker Chemicals & Plastics Corporation. Fire retardant unsaturated polyesters. 3,992,480, Cl. 260-863.000.
Dornbach, William H., Jr., to Dornback Furnace and Foundry Co. Gas burner. 3,991,941, Cl. 239-552.000.
Dornback Furnace and Foundry Co.: *See—*
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Dounchis, Harry, to FMC Corporation. Triaryl phosphate ester functional fluids. 3,992,309, Cl. 252-49.800.
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Dreisin, Alexander, to Allis-Chalmers Corporation. Fuel injection timing control. 3,991,732, Cl. 123-140.00R.
Dresser Industries, Inc.: *See—*
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Dreyer, John F., to Minnesota Mining and Manufacturing Company. Apparatus and method for converting mechanical wave energy to optical energy. 3,991,606, Cl. 73-67.50H.
Dreyer, Paul. Boot with extension leg. 3,991,492, Cl. 36-109.000.
Driskell, Carl R., to United States of America, Navy. Color panoramic laser projector. 3,992,718, Cl. 358-61.000.
Drobish, James Lee; and Gougeon, Thomas William, to Procter & Gamble Company, The. Vaginal medicament dispensing means. 3,991,760, Cl. 128-260.000.
Drynan, Anthony Augustus. Blender. 3,991,983, Cl. 259-182.000.

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Duffy, Lawrence Edward. Ejector toothbrush. 3,991,776, Cl. 132-84.00R.
Dugan, Daniel W. Automatic microphone mixer. 3,992,584, Cl. 179-1.0AT.
Dulis, Edward J.; Fleck, James N.; and Powell, Joseph W., to Crucible Inc. Method for producing aperture-containing powder-metallurgy article. 3,992,202, Cl. 75-222.000.
Dumas, David H., to Hercules Incorporated. Water-dispersible thermosettable cationic resins and paper sized therewith. 3,992,345, Cl. 260-29.7AT.
Duncan, Samuel G. Fluid actuated reciprocating tool. 3,991,601, Cl. 72-391.000.
Dunn, Gerald A., to United States of America, Army. Rate multiplier. 3,992,612, Cl. 235-150.300.
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Eaton, Thomas, to ITL Technology Inc. Electrically operated proportionate valve. 3,991,972, Cl. 251-11.000.
Eberhardt, Edward H., to International Telephone and Telegraph Corporation. Fast triplanar detector with coaxial connector output. 3,992,621, Cl. 250-207.000.
Eberle, Marcel K.; and Manning, Robert E., to Sandoz, Inc. 2-Amino-5-(substituted or unsubstituted phenylalkyl)-thiadiazoles. 3,992,396, Cl. 260-306.80D.
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Egli, Bruno; and Niklaus, Manser. Photometer circuitry for the digital indication of the light absorption of a test sample. 3,992,113, Cl. 356-206.000.
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Eijsermans, Petrus Antonius Henricus C., to Hapa Holland N.V. Machine-en Apparatenfabriek. Device for bundling flat flexible objects. 3,991,541, Cl. 53-124.00A.
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Emmons, William D.; Moser, Vincent J.; Brodnyan, John G.; and Shachat, Norman, to Rohm and Haas Company. Highly absorbent copolymers and foamed articles having rewettability made therefrom. 3,992,333, Cl. 260-2.50R.
Endo, Makoto: *See—*
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Engel, Stephen August, to Union Carbide Corporation. Apparatus for making an instantaneous scarfing start. 3,991,985, Cl. 266-51.000.
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Erby, William A.; and Walde, Robert A., to Air Products and Chemicals, Inc. Method of preparing halogenated lactone. 3,992,415, Cl. 260-343.600.
Erickson, Floyd B., to Monsanto Company. Imagewise distribution of sulfate group on substrate polymer by photographic techniques. 3,992,209, Cl. 96-67.000.
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Etherton, Billy D.: *See—*
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Fahnestock, Melvin R.; and Thornton, Kirby I., to Aluminum Company of America. Method and apparatus for inspecting articles for openings. 3,991,882, Cl. 209-73.000.

Falk, Edward J., to Wagner Electric Corporation. Brake pressure distribution valve and system. 3,992,063, Cl. 303-6.00C.

Fan, George J.: *See—*
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Farish, H. Greggs, to Wood Industries, Inc. Zig-zag web folder apparatus. 3,991,994, Cl. 270-73.000.

Farley, Charles Edward, to American Cyanamid Company. Control of pulp-paper mill pitch deposits. 3,992,249, Cl. 162-72.000.

Farre, Luis. Printing fabric. 3,992,142, Cl. 8-16.000.

Farrow, Robin Frederick Charles, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Surface treatment of III-V compound crystals. 3,992,233, Cl. 148-175.000.

Fasching, George E., to United States of America, Energy Research and Development Administration. Multiple channel coincidence detector and controller for microseismic data analysis. 3,992,672, Cl. 328-110.000.

Fassman, Arnold; and Mersereau, Robert E., to Pitney-Bowes, Inc. Sheet registering apparatus. 3,992,002, Cl. 271-221.000.

Fastner, Thorwald; and Schrambock, Baldur, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Casting tube with a bottom opening for continuously casting steel strands. 3,991,815, Cl. 164-281.00R.

Faucher, Joseph A.; and Rosen, Meyer R., to Union Carbide Corporation. Shaped article for conditioning hair fabricated from quaternary nitrogen-containing cellulose ether. 3,992,336, Cl. 260-17.00R.

Faulk, Paul Dudley. Combination game call. 3,991,513, Cl. 46-180.000.

Faust, James H.; and Busse, Walter M., to A.B.C. Auto Alarms, Inc. Siren for alarm and method of making the same. 3,991,703, Cl. 116-147.000.

Fazzalari, Frank A. Process of using biocidal solutions containing copper sulfate. 3,992,146, Cl. 21-58.000.

FCE-Dillon, Inc.: *See—*
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Fencl, Vernon R.; and Rigas, Demetrios J., to Grotnes Machine Works, Inc. Apparatus for determining imbalance of tires and the like. 3,991,620, Cl. 73-462.000.

Fengler, Werner H. High-wear resistant composite seal. 3,992,164, Cl. 29-196.000.

Ferber, Benjamin I.; Sharp, Fredrick A.; and Freedman, Robert W., to United States of America, Interior. Dosimeter for oxides of nitrogen. 3,992,153, Cl. 23-232.00R.

Fergeson, Allen Dennis, to Bell Telephone Laboratories, Incorporated. Self-checking read and write circuit. 3,992,696, Cl. 340-146.1AG.

Feron, Andre; and Bochurberg, Claude. Spring biased thigh and pelvic muscle toning apparatus. 3,992,004, Cl. 272-141.000.

Ferranti-Packard Limited: *See—*
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Ferrara, Achille K., to Ultramatic Equipment Company. Vibratory finishing equipment. 3,991,524, Cl. 51-163.100.

Ferrari, Harry. Dynamic resiliency of tennis balls. 3,992,241, Cl. 156-272.000.

Fey, Maurice G.; and Dancy, Edna A., to Westinghouse Electric Corporation. Metal powder production by direct reduction in an arc heater. 3,992,193, Cl. 75-.50B.

Fielding, Ivor R.; Poppe, Wassily; Schwartz, Michael M.; and Whelan, James P., to Standard Oil Company (Indiana). Inhibition of liquid and vapor transmission through plastic-substrate seals. 3,992,224, Cl. 29-623.500.

Fields, Ellis K.: *See—*
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Filer, Armand Jay, to United States of America, Navy. Programmable underwater acoustic beacon. 3,992,692, Cl. 340-5.00R.

Finck, Darrel S. Hydroponic device and method. 3,991,514, Cl. 47-1.200.

Finger, Eugene P., to Curtis Instruments, Inc. Electro-thermal readout coulometer. 3,992,667, Cl. 324-94.000.

Finger, Eugene P., to Curtis Instruments, Inc. Electro-thermal readout of coulometers. 3,992,668, Cl. 324-94.000.

Fini, Anthony W., Jr. Educational device for teaching numerical control. 3,991,652, Cl. 90-13.00C.

Finn, Lawrence R.; and Yawberg, Richard C., to Owens-Corning Fiberglas Corporation. Packaging apparatus for compressible strips. 3,991,538, Cl. 53-21.0FW.

Firmenich S.A.: *See—*
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Fischer, Hanspeter: *See—*
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Fischer & Porter Co.: *See—*
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Fishaber, Marvin H.; and White, Philip C., to Dow Chemical Company, The. Powderless etching method for magnesium printing plates. 3,992,234, Cl. 156-13.000.

Fisher Controls Company, Inc.: *See—*
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Fisher, Donald J., to Xerox Corporation. Roughened imaging surface for cleaning. 3,992,091, Cl. 355-15.000.

Fishwick, Brian Ribbons: *See—*
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Flannery, Robert E.; and LoVecchio, Paul, to United States of America, Army. Apparatus and method of X-ray topography at cryogenic temperature. 3,992,624, Cl. 250-273.000.

Fleck, James N.: *See—*
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Flom, Leonard; and Rodgerson, Kenneth J. Posterior chamber artificial intraocular lens with retaining means and instruments for use therewith. 3,991,426, Cl. 3-13.000.

Flom, Merton C.; and Adams, Anthony J., to Optical Sciences Group, Inc. Visual acuity tester. 3,992,087, Cl. 351-7.000.

FMC Corporation: *See—*
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Ihrig, David C.; Cooley, Jack L.; and Boex, Michael W., 3,992,491.

Foell, Theodore J.; and Rees, Richard W. A., to American Home Products Corporation. [D-2-(1,4-Cyclohexadienyl)gly]^{6}-des-gly^{10}-lrh nonapeptide amides. 3,992,530, Cl. 424-177.000.

Folgero, Kare: *See—*
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Fomby, Kenneth A. Applicator brush and method of making same. 3,992,116, Cl. 401-129.000.

Forbes, Eric Simon; and Meldrum, Ian Grieg, to British Petroleum Company Limited, The. Copolymers. 3,992,310, Cl. 252-59.000.

Ford, Edward B., Jr. Latch for pan covers. 3,991,902, Cl. 220-324.000.

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Foster Grant Co., Inc.: *See—*
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Foster, Phillip W., to Lee Blacksmith, Inc. Combination post-plowing cultivating implement and field drag. 3,991,831, Cl. 172-198.000.

Foster Wheeler Energy Corporation: *See—*
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Frank, Burton E.; Legacy, Lloyd W.; and Walker, Dean S., to Minnesota Mining and Manufacturing Company. Synthetic fibrous buff. 3,991,526, Cl. 51-358.000.

Frank, Eldon M., to F & W Company, Inc. Tractor mounted implement device. 3,991,890, Cl. 214-131.00A.

Frank, Robert G., to PPG Industries, Inc. Shaping glass sheets. 3,992,181, Cl. 65-104.000.

Frank, Robert G., to PPG Industries, Inc. Conveying sheets at non-uniform speed. 3,992,182, Cl. 65-163.000.

Franklin, Earl E. Machine for delivering secondary work-pieces to primary work-pieces. 3,992,245, Cl. 156-571.000.

Franz, Helmut: *See—*
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Frazer, Richard A.; and Taczak, William J., Jr., to United States of America, Navy. Multi-spectral optical comparator. 3,992,110, Cl. 356-189.000.

Frazier, Larry Vane W. Fluid pressure power plant with double-acting piston. 3,991,574, Cl. 60-645.000.

Frechin, Jean-Paul, to Garcia Corporation. Ski binding. 3,992,037, Cl. 280-613.000.

Frederickson, Robert E., to McCulloch Corporation. Safety braking mechanism for a portable chain saw. 3,991,469, Cl. 30-381.000.

Fredriksson, Bengt: *See—*
Andersson, Conny; Folgero, Kare; Fredriksson, Bengt; Hedberg, Birger; Steinarson, Steinar; and Oberg, Karl-Erik, 3,991,813.

Freedman, Robert W.: *See—*
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Freeman, David; and Blandford, Brian, to Rank Organisation Limited, The. Lens structure. 3,992,078, Cl. 350-2.000.

Frey, James O.: *See—*
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Frey, Lyle D.: *See—*
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Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
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Friederichs, Paul; and Vitt, Theodor, to Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co. Concealed hinge for furniture. 3,991,437, Cl. 16-139.000.

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Friedrich, Leonard A.; Rutz, David A.; and Dardi, Louis E., to United Technologies Corporation. Method of fabricating titanium alloy matrix composite materials. 3,991,928, Cl. 228-190.000.

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Frost, John E. Swing-frame animal trap. 3,991,509, Cl. 43-90.000.

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Fuji Photo Optical Co., Ltd.: *See—*
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Fujikawa, Tetsuzo; and Tamba, Shinichi, to Kawasaki Jukogyo Kabushiki Kaisha. Rotary engine of the type cooled by an air-fuel mixture intake. 3,991,722, Cl. 123-8.130.

Fujiki, Hironao: *See—*
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Fujio, Bunzo; Sasaki, Yasushi; and Takada, Hiromi, to Yamura Kabushikikaisha Shinko Seisakusho. Type element mounting for high speed type positioning mechanism. 3,991,872, Cl. 197-53.000.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Umio, Suminori; and Maeno, Shizuo, 3,992,409.

Fukata, Yasuo: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 3,992,572.

Fukuda, Minolu: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.

Fukuda, Rikiya: *See—*
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,527.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,551.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,552.

Fukuda, Shigeo: *See—*
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Fullerton Metals Co.: *See—*
Altman, Hugo; and Ryan, Patrick L., 3,991,952.

Furuta, Akio: *See—*
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Furuya, Katsuhiko: *See—*
Michishita, Hisakichi; Yanagidaira, Hidetaka; and Furuya, Katsuhiko, 3,992,673.

Furuyama, Norihide: *See—*
Yamada, Mitsuyoshi; Hatada, Hideo; Izumisawa, Masato; Machida, Hiromasa; and Furuyama, Norihide, 3,992,647.

Futagawa, Yoshikiyo: *See—*
Aizawa, Susumu; Futagawa, Yoshikiyo; and Kuriya, Katsumi, 3,991,671.

G. D. Searle & Co.: *See—*
Chien, Yie W.; and Lambert, Howard J., 3,992,518.
Christian, John W.; and Renbarger, Jerry J., 3,992,147.
Mueller, Richard A., 3,992,375.

Gabler, Rudolf: *See—*
Studinka, Josef; and Gabler, Rudolf, 3,992,504.

Gabriele, Thomas L.; Willey, Francis J., III; and Ziegler, Charles W., to United States of America, Navy. Target tracker having target recognition means. 3,992,710, Cl. 343-16.00M.

GAF Corporation: *See—*
Terwilliger, Bruce J., 3,991,529.

Gall, Martin, to Upjohn Company, The. Novel imidazobenzodiazepine derivative. 3,992,393, Cl. 260-296.00T.

Gall, Martin, to Upjohn Company, The. 1-(α-Phenyl-o-tolyl)imidazoles. 3,992,400, Cl. 260-309.000.

Gall, Martin, to Upjohn Company, The. Phthalimido alkanone, ethylene ketals. 3,992,408, Cl. 260-326.00N.

Galletti, Cesare, to Innocenti Santeustacchio S.p.A. Apparatus for feeding coils of strip to an unwinding station. 3,991,951, Cl. 242-78.600.

Galperin, Alexandr Lvovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Zabotin, Alexandr Alexandrovich; and Sakharov, Boris Alexandrovich. Weft thread shuttle for travelling wave shedding looms. 3,991,794, Cl. 139-196.300.

Galton, Renee. Device for stocking, filing and displaying small articles. 3,992,068, Cl. 312-202.000.

Gandon, Louis: *See—*
Lemarinel, Robert; Demarthe, Jean-Michel; and Gandon, Louis, 3,992,270.

Gannac, Jean-Philippe. Safety harness for use by a child in a vehicle. 3,992,040, Cl. 280-744.000.

Gannon, Peter F., to Vinyl-Fab Industries. Safety ladder for above-the-ground swimming pools. 3,991,851, Cl. 182-86.000.

Gano, John C., to Otis Engineering Corporation. High/low safety valve. 3,991,784, Cl. 137-458.000.

Garbarini, Victor Charles, to Bell Telephone Laboratories, Incorporated. Etching of thin layers of reactive metals. 3,992,235, Cl. 156-13.000.

Garcia Corporation: *See—*
Frechin, Jean-Paul, 3,992,037.

Gardy, Victor R.: *See—*
Garland, Newton C.; Gardy, Victor R.; Wetzel, Lewis K.; Haberstroh, August J.; Folsom, Lawrence R.; Cloutier, Maurice P.; and Chamberlain, Peter L., 3,991,650.

Garland, Newton C.; Gardy, Victor R.; Wetzel, Lewis K.; Haberstroh, August J.; Folsom, Lawrence R.; Cloutier, Maurice P.; and Chamberlain, Peter L., to General Electric Company. Gun self powered drive system. 3,991,650, Cl. 89-43.00R.

Garlick, George Frederick John; Steigmann, Gottfried Albert; and Lamb, William Edward, to National Research Development Corporation. Differential optical polarization detectors. 3,992,571, Cl. 178-6.000.

Garrett Corporation, The: *See—*
Sperr, Charles J., Jr., 3,992,690.

Gartner, Klaus W., to Sargent & Greenleaf, Inc. Tumbler wheel, changeable combination key lock construction. 3,991,596, Cl. 70-303.00A.

Gassman, Paul G., to Ohio State University Research Foundation, The. Synthesis of indoles from anilines and intermediates therein. 3,992,392, Cl. 260-294.80C.

Gates Rubber Company, The: *See—*
Pennell, Phillip E., 3,991,445.
Tally, David N., 3,992,505.

Gatfield, Edward W., to Belden Corporation. Composite welding cable having gas ducts and switch wires therein. 3,992,565, Cl. 174-15.0WF.

Gath, Rudolph Hans; Fuchs, Hugo; Schmitz, Ruediger; Kartte, Klaus; and Brand, Uwe, to BASF Aktiengesellschaft. Processing polycaprolactam extraction liquors. 3,992,372, Cl. 260-239.30A.

Gattel, Paule A.: *See—*
Plan, Robert A. M.; Liautaud, Jacques C.; Makula, Marie-France; Gattel, Paule A.; Pla, Jean F.; and Debrus, Andre J. M., 3,992,367.

Gaupp, Raymond H.; and Nygren, John A., Jr., to Drew Chemical Corporation. Corrosion inhibitor. 3,992,318, Cl. 252-389.00A.

Gebr. Klockner KG: *See—*
Kolb, Lothar, 3,991,945.

Gebruder Sucker: *See—*
Kracke, Jurgen; Miemietz, Hans-Peter; Derichs, Wilfried; Richer, Werner; and Stadelmann, Johann, 3,991,448.

Gebrueder Buehler AG: *See—*
Drake, Johannes, 3,991,971.

Geering, Emil J.: *See—*
Dannels, Bobby F.; and Geering, Emil J., 3,992,289.

Geiger, Kermit K., to Felt Products Mfg. Co. Deck and roadway gap sealing assembly. 3,992,121, Cl. 404-47.000.

Geiser, Edward M., to Universal Oil Products Company. Apparatus for moisture addition to engine air-fuel input. 3,991,724, Cl. 123-25.00R.

Gelinas, William: *See—*
Hulstein, Calvin; and Gelinas, William, 3,991,704.

Gemco-Ware, Inc.: *See—*
Schiessel, Walter, 3,991,947.

General Aquadyne, Inc.: *See—*
Jones, Richard F., 3,991,423.

General Atomic Company: *See—*
Holden, Robert B., 3,992,494.

General Electric Company: *See—*
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Danzig, Ivan F.; La Conti, Anthony B.; and Amore, Joseph M., 3,992,271.
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Hornung, Richard E., 3,991,615.
Kaduk, Edward E., 3,992,645.
Kelley, Fred W., Jr., 3,992,661.
Kotheimer, William C.; and Wilkinson, Stanley B., 3,992,649.
Laskaris, Evangelos T., 3,991,587.
Laskaris, Evangelos T., 3,991,588.
Markezich, Ronald L., 3,992,406.
Markezich, Ronald L., 3,992,407.
Mayor, Harry A.; and Minkkinen, George W., 3,991,564.

General Foods Corporation: *See—*
Marks, William M., 3,991,926.

General Instrument of Canada Ltd.: *See—*
Igarashi, Shigeru, 3,992,578.

General Mills, Inc.: *See—*
Blake, Jon R.; and Miller, Harold E., 3,992,554.

General Motors Corporation: *See—*
Coulter, James L.; and Lorenz, Harald H., 3,991,859.
Kovats, Laszlo I., 3,991,962.
Lunsford, Jimmy L.; and Nelson, Harry N., 3,992,128.
Ristau, Theodore F., 3,992,117.
Schroff, Dennis E., 3,991,558.
Wagner, Douglas A., 3,991,818.

General Signal Corporation: *See—*
Sibley, Henry C.; Auer, John H., Jr.; and Smith, Willis R., 3,991,958.

General Staple Company, Inc.: *See—*
Zahn, Irwin; and Rosenberg, Renate, 3,991,452.

General Tire & Rubber Company, The: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 3,992,561.

Genese, Joseph Nicholas, to Arbrook, Inc. Surgical evacuator. 3,991,763, Cl. 128-278.000.

Genjida, Fumihide; Ii, Motohiko; and Nasuno, Toyoaki, to Sanyo Chemical Industries, Ltd. Non-inflammable hydraulic fluid. 3,992,312, Cl. 252-77.000.

Genthe, James E.; and Buchan, William R., to Itek Corporation. Cascade development station having a roughened development plate for enhancing developer mixture turbulence. 3,991,712, Cl. 118-637.000.

Gerber, Dennis H., to Burke Industries, Inc. Solar energy heat transfer system. 3,991,742, Cl. 126-271.000.

Gerber, Dennis H.: *See—*
Burke, Norman R.; Kutnewsky, Drace W.; Price, Virgil C.; and Gerber, Dennis H., 3,991,900.

Gerber Garment Technology, Inc.: *See—*
Pearl, David R., 3,991,706.

Gerchman, Lois L.: *See—*
Lagow, Richard J.; Gerchman, Lois L.; and Jacob, Robert A., 3,992,424.

Gerhold, Clarence G., to Universal Oil Products Company. Effluent fractionation in simulated moving-bed adsorption processes. 3,992,469, Cl. 260-674.0SA.

Gerholt, Willem; and Heidemann, Gerrit, to Industriele Onderneming Wavin N.V. Connections for insulated pipes. 3,992,237, Cl. 156-86.000.

Germania Dairy Automation Incorporated: *See—*
Reisgies, Rolf W., 3,991,716.

Gernetzke, William, deceased: *See—*
Ward, George C.; and Gernetzke, William, deceased, 3,991,986.

Gerow, Frank J., to Dow Corning Corporation. Penile implant. 3,991,752, Cl. 128-79.000.

Gertzman, Arthur A., to Ethicon, Inc. Surgical adhesive tape. 3,991,754, Cl. 128-156.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
Bargel, Gunther; Tyslauk, Willy; Unger, Eberhard; and Muller, Wolfgang, 3,992,060.

Gewiss, Lucien Victor, to Marc Wood International, Inc. Sheet with alternate protrusions and recesses. 3,992,162, Cl. 29-193.500.

GF Business Equipment, Inc.: *See—*
Westover, Fred R.; and Williams, Philip J., 3,991,965.

Ghiringhelli, Hugh A.: *See—*
Grosbard, Gregory; and Ghiri. ghelli, Hugh A., 3,992,286.

Giallorenzi, Thomas G., to United States of America, Navy. Frequency tunable acoustooptic mode filter. 3,992,079, Cl. 350-96.00C.

Giammarise, Anthony T.: *See—*
Waehner, Kenneth A.; and Giammarise, Anthony T., 3,992,511.

Gibson, Joseph W., Jr. Attachment for aquarium tanks. 3,991,715, Cl. 119-5.000.

Giger, Walter, Jr.; and Westervelt, Rudy G., to Council of Livestock Protection, Inc. Double-rail conveyor design. 3,991,438, Cl. 17-1.00A.

Giger, Walter, Jr., to Council of Livestock Protection, Inc. Mechanized shackling/hoisting. 3,991,441, Cl. 17-24.000.

Gilbert, Harold James, to Wickman Machine Tool Sales Limited. Spindle drives for multi spindle lathes. 3,991,453, Cl. 29-37.00R.

Girardin, Gaston A. Power saw guide assembly. 3,991,643, Cl. 83-564.000.

Girling Limited: *See—*
Harries, David Anthony, 3,991,573.

Gittins, Derek R.; and Gregory, Michael D., to Racal Instruments Ltd. Frequency control circuits such as for use in modulation measurement. 3,992,670, Cl. 325-134.000.

Glasby, Francis Goff, to Robinson & Sons Limited. Observation of moving webs. 3,991,663, Cl. 93-94.00R.

Glaser, David: *See—*
Chodil, Gerald J.; DeJule, Michael C.; and Glaser, David, 3,992,644.

Global Castors and Hardware Limited: *See—*
James, Michael Joseph, 3,991,434.

Glory Kogyo Kabushiki Kaisha: *See—*
Ushio, Masatoshi; Ikeuchi, Hisakazu; and Nakajima, Yukinobu, 3,991,778.

Gluntz, Glenn Harlen, to Du Pont de Nemours, E. I., and Company. Circuit board socket. 3,992,076, Cl. 339-258.00R.

Goddard, Steven Jerome, to Du Pont de Nemours, E. I., and Company. Herbicidal isoindol-1-one derivatives. 3,992,189, Cl. 71-96.000.

Godshalk, James B., to Ultra-Mold Corporation. Anti-explosion cap for storage batteries. 3,992,226, Cl. 429-89.000.

Goenner, Albert O. Anti theft locking system. 3,991,594, Cl. 70-30.000.

Goldbach, Henry T., to Western Gear Corporation. Shock absorbing and retracting system for pipe laying vessel. 3,991,584, Cl. 61-111.000.

Golden, Steven T. Golf club swing training method. 3,992,013, Cl. 273-186.00D.

Golenski, Stephen S., to Singer Company, The. Driving test range. 3,991,485, Cl. 35-11.000.

Goodfield, Barry A. Process for treating psychophysiological condition. 3,991,744, Cl. 128-2.00H.

Goodhart, Richard Bernard: *See—*
Beckius, Herbert Jean-Pierre; and Goodhart, Richard Bernard, 3,991,888.

Goodyear Tire & Rubber Company, The: *See—*
Cottman, Kirkwood S., 3,992,354.
Krishnan, Ram M., 3,992,502.
Parkinson, Alan R., 3,992,448.

Gordon, Stuart; Evans, Geoffrey Ian; and Jones, Philip Graham, to Imperial Metal Industries (Kynoch) Limited. Solid propellant with inhibitor layer in rocket motor. 3,991,565, Cl. 60-255.000.

Gottschaldt, Joachim: *See—*
Horhold, Hans-Heinrich; Gottschaldt, Joachim; Bergmann, Regina; Opfermann, Johannes; Seliger, Walter; Augst, Siegfried; and Arnstadt, Hartmut, 3,992,203.

Gougeon, Thomas William: *See—*
Drobish, James Lee; and Gougeon, Thomas William, 3,991,760.

Gould Inc.: *See—*
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 3,991,572.

Gould, Joseph C.: *See—*
Hayes, Robert L.; and Gould, Joseph C., 3,991,604.

Gourdine, Meredith C.; Diamond, Stephen; and Porter, Donald, to Energy Innovations, Inc. Electrogasdynamic production line coating system. 3,991,710, Cl. 118-634.000.

Graeber, Ewald: *See—*
Stampfer, Michael; Graeber, Ewald; Oni, Helmut; and Ruede, Ernst, 3,991,618.

Graham, Dale Wells, to Whirlpool Corporation. Appliance door opening device. 3,991,520, Cl. 49-276.000.

Graham, Shirl O.; and Gurusiddaiah, Sarangamat, to Research Corporation. Anti-viral substance containing peptide, fatty acid and carbohydrate moieties. 3,992,528, Cl. 424-177.000.

Granetzke, Dennis C.: *See—*
Cook, Neal A.; Costello, Norman F.; and Granetzke, Dennis C., 3,991,821.

Grant, James N.: *See—*
Thelen, Alfred J.; Aguilera, John A.; Grant, James N.; and Michel, George Eugene, 3,991,707.

Granzer, Ernold: *See—*
Teufel, Hermann; Bartmann, Wilhelm; Beck, Gerhard; and Granzer, Ernold, 3,992,538.

Graphic Sciences, Inc.: *See—*
Rhyins, Richard W.; Rand, Ralph; Costello, Matthew J.; and Krallinger, Robert E., 3,992,623.

Grass, John W.: *See—*
Zipin, Richard B.; Hart, John E.; and Grass, John W., 3,991,477.

Grasslands Pty. Limited: *See—*
Allwood, John, 3,991,544.

Graulier, Maxime: *See—*
Benaroya, Gerard; Graulier, Maxime; Long, Jacques; and Laine, Francois, 3,992,463.

Green, Gary Warner; and Feder, Ernest, to United Technologies Corporation. Sound absorption with variable acoustic resistance means. 3,991,849, Cl. 181-33.00H.

Green, Michael J., to Schering Corporation. Process for the preparation of 21-halogeno-21-desoxy-17α-acyloxy-20-keto-pregnenes. 3,992,422, Cl. 260-397.450.

Green, William M. Escape door for trailer. 3,992,052, Cl. 296-28.00M.

Green, Winje: *See—*
Lang-Ree, Nils; Nilsson, Kurt; Hemborg, Goeran; and Green, Winje, 3,991,665.

Greenwood, John Carlton: *See—*
Day, Ian; and Greenwood, John Carlton, 3,992,559.

Gregory, Michael D.: *See—*
Gittins, Derek R.; and Gregory, Michael D., 3,992,670.

Greive, Aloys: *See—*
Scherf, Siegfried; and Greive, Aloys, 3,991,546.

Greve, Peter Ferdinand: *See—*
Velzel, Christiaan Hendrik Frans; and Greve, Peter Ferdinand, 3,992,575.

Griffin, Dana K.; and Wilson, John R. Dust mop with peel-off mop head. 3,991,432, Cl. 15-229.0BP.

Griffiths, Brian John: *See—*
Chandra, Grish; Griffiths, Brian John; and Westall, Stephen, 3,992,427.

Grimes, Eldon L.; and Lerch, David W., to Marine Construction & Design Co. Moving belt-type oil skimmer with propulsion induced flow, method and apparatus. 3,992,292, Cl. 210-30.00A.

Griss, Gerhart: *See—*
Kleemann, Manfred; Kahling, Joachim; Griss, Gerhart; and Hurnaus, Rudolf, 3,992,536.

Gritz, Heinz Albert: *See—*
Hofmann, Eberhard; Gritz, Heinz Albert; and Vlazak, Otto, 3,992,519.

Grodinsky, Robert M.: *See—*
Turner, Jacob C.; Elliott, Douglas M.; Grodinsky, Robert M.; and Mills, Thomas F., 3,992,585.

Groh, Edward F.: *See—*
Rowley, James P.; Lewandowski, Edward F.; and Groh, Edward F., 3,991,599.

Grosbard, Gregory; and Ghiringhelli, Hugh A., to Eocene Research (Entire). Mineral ore concentractor. 3,992,286, Cl. 209-1.000.

Grosboll, Martin P.; and Edison, Robert R., to Atlantic Richfield Company. Method contacting a bed of solid particles with a stream containing particulate impurities. 3,992,282, Cl. 208-46.000.

Grosjean, Robert M. Disposable device for sharpening leads or the like. 3,991,798, Cl. 144-28.100.

Grotnes Machine Works, Inc.: *See—*
Fencl, Vernon R.; and Rigas, Demetrios J., 3,991,620.

GTE Automatic Electric Laboratories Incorporated: *See—*
Dades, John Willson, 3,992,669.

GTE Sylvania Incorporated: *See—*
Blaisdell, Leonard L.; and Tetreault, Normand E., 3,992,652.
Shaffer, John W., 3,992,136.

Guadano, Bernard, Sr. Shopping cart. 3,992,038, Cl. 280-659.000.

Gullick Dobson Limited: *See—*
Allen, Archelaius Dawson, 3,991,580.
Cooke, John; and Alker, Derek, 3,991,578.

Gumbs, Alexis A., deceased (by Gumbs, Uranie L., administratrix), to Raymond Lee Organization, Inc., The, a part interest. Shoe last. 3,991,430, Cl. 12-115.200.

Gumbs, Uranie L., administratrix: *See—*
Gumbs, Alexis A., deceased, 3,991,430.

Gunn, Sidney W.: *See—*
Coale, Thomas E.; Gunn, Sidney W.; Merrigan, Frank; and Tompkins, Donald M., 3,991,673.

Gunnebo Bruks Aktiebolag: *See—*
Larsson, Sven Gunnar Olof, 3,991,501.

Gurusiddaiah, Sarangamat: *See—*
Graham, Shirl O.; and Gurusiddaiah, Sarangamat, 3,992,528.

Gutbier, Heinrich, to Siemens Aktiengesellschaft. Method and apparatus for removing reaction water from fuel cells. 3,992,223, Cl. 429-14.000.

Guthorlein, Gerhard: *See—*
Konig, Wolfgang; Zwisler, Oswald; and Guthorlein, Gerhard, 3,992,529.

Gutierrez, Eddie N.; and Reardon, Robert C., Jr., to Lever Brothers Company. Process for the preparation of selectively halogenated ketals. 3,992,414, Cl. 260-340.900.

Gwatkin, Ralph B. L., to Merck & Co., Inc. Anti-fertility vaccine comprising solubilized zona pellucida and anti-serum. 3,992,520, Cl. 424-85.000.

H.G.N. Motoren GmbH & Co.: *See—*
Notaro, Pietro, 3,991,729.

Haarmann, Walter: *See—*
Trummlitz, Gunter; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; Haarmann, Walter; and Engelhardt, Gunther, 3,992,535.

Habermeier, Jurgen, to Ciba-Geigy Corporation. Bis-(hydantoinyl)-benzimidazolene compounds containing hydroxyalkyl groups. 3,992,401, Cl. 260-309.200.

Haberski, Richard J.: *See—*
Litke, William R.; and Haberski, Richard J., 3,991,823.

Haberstroh, August J.: *See—*
Garland, Newton C.; Gardy, Victor R.; Wetzel, Lewis K.; Haberstroh, August J.; Folsom, Lawrence R.; Cloutier, Maurice P.; and Chamberlain, Peter L., 3,991,650.

Haebler, Wolfgang: *See—*
Sommer, Richard; and Haebler, Wolfgang, 3,992,143.

Hagan, James Patrick: *See—*
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, 3,991,497.

Haines, Walter E. Dip stick with sealing sleeve. 3,991,476, Cl. 33-126.70R.

Halbach, Edward A., to Allis-Chalmers Corporation. Interlock for arc chute of circuit maker and breaker. 3,992,599, Cl. 200-144.00R.

Hall, Bertie F., Jr. Thermoelectric device. 3,992,229, Cl. 136-227.000.

Hall, Thomas D. Device for applying stocking. 3,991,920, Cl. 223-111.000.

Hall, William: *See—*
Arutt, Kennuth; and Hall, William, 3,992,606.

Halpern, Gerald M.: *See—*
Schmidt, George; Halpern, Gerald M.; and Thomas, William R. L., 3,992,625.

Hamada, Masa: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Takamatsu, Akira; Oki, Toshikazu; and Tone, Hiroshi, 3,992,524.

Hamblin, Richard David, to Archibald Kenrick and Sons Limited. Letter plates. 3,991,934, Cl. 232-46.000.

Hamel GmbH Zwirnmaschinen: *See—*
Scherf, Siegfried; and Greive, Aloys, 3,991,546.

Hammann, Ingeborg: *See—*
Sirrenberg, Wilhelm; Hammann, Ingeborg; Stendel, Wilhelm; and Schramm, Jurgen, 3,992,553.

Hammer, Waldemar. Quick-adjustable fence unit for a woodworking table. 3,991,991, Cl. 269-318.000.

Hamprecht, Gerhard; Mangold, Dietrich; and Koenig, Karl-Heinz, to BASF Aktiengesellschaft. Production of sulfamic acid halides. 3,992,444, Cl. 260-543.00R.

Hamworthy Engineering Limited: *See—*
Wray, Stanley William, 3,992,299.

Hankins, Norman K.; and DeMonsy, Richard L., to Hexcel Corporation. Protective cable enclosure, cable assembly including the same, and method of encapsulating a cable in a protective enclosure. 3,992,569, Cl. 174-92.000.

Hanna, Harry Allen, to Medical R & D, Limited. Patient monitoring system and method. 3,991,746, Cl. 128-2.00S.

Hannula, Raymond H., to Allen-Bradley Company. Mechanical motion detector. 3,992,597, Cl. 200-61.390.

Hansen, Howard C.: *See—*
Chichester, Willard L.; and Hansen, Howard C., 3,991,846.

Hansen, Lloyd Frank, to American Cyanamid Company. Antibiotic susceptibility testing. 3,992,265, Cl. 195-127.000.

Hanson, John P.; Sabolcik, Rudolph E.; and Svedberg, Robert C., to United States of America, Energy Research and Development Administration. Vacuum foil insulation system. 3,991,898, Cl. 220-9.00D.

Hanson, Paul B. Articulated bed. 3,991,428, Cl. 5-63.000.

Hapa Holland N.V. Machine-en Apparatenfabriek: *See—*
Eijsermans, Petrus Antonius Henricus C., 3,991,541.

Harcuba, Siegfreid: *See—*
Harcuba, Siegfried; and Dits, Herbert, 3,991,602.

Harcuba, Siegfried; and Dits, Herbert, to Harcuba, Siegfreid. Press for cold forming of workpieces from a metal sheet. 3,991,602, Cl. 72-455.000.

Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, to General Tire & Rubber Company, The. Preparation of solution polymers. 3,992,561, Cl. 526-181.000.

Harima Chemicals, Inc.: *See—*
Ishigami, Masahisa; Arimoto, Kunio; Inoue, Yoshikazu; and Fujii, Ryoichi, 3,992,510.

Harlan, James T., Jr.; and St. Clair, David J., to Shell Oil Company. Primers for use between metal substrates and block copolymers. 3,992,339, Cl. 260-27.0BB.

Harries, David Anthony, to Girling Limited. Master cylinder assemblies for vehicle hydraulic braking systems. 3,991,573, Cl. 60-550.000.

Harrington, Timothy M.: *See—*
Marshall, J. Howard, III; and Harrington, Timothy M., 3,991,611.

Harris, Paul Anthony, to Lucas Electrical Company Limited, The. Spark ignition systems for internal combustion engines. 3,991,733, Cl. 123-148.00E.

Hart, Harold: *See—*
Donohue, John A.; Fields, Ellis K.; and Hart, Harold, 3,992,435.

Hart, John E.: *See—*
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Isaacson, Max, to Vibrodyne, Inc. Vibratory apparatus with improved motor actuated door mechanism for closing the discharge outlet. 3,991,523, Cl. 51-163.100.

Ishibashi, Keijiro: *See—*
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,527.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,551.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,552.

Ishida, Mitsuo: *See—*
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,527.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,551.
Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,552.

Ishida, Yozo: *See—*
Tazaki, Sandanori; and Ishida, Yozo, 3,991,576.

Ishigami, Masahisa; Arimoto, Kunio; Inoue, Yoshikazu; and Fujii, Ryoichi, to Harima Chemicals, Inc. Method for recovery of iodine. 3,992,510, Cl. 423-500.000.

Ishiguro, Toshihiro: *See—*
Kawashima, Kenya; Saraie, Takahiro; Kawano, Yasuhiko; and Ishiguro, Toshihiro, 3,992,370.

Ishihara, Norisue. Adjustable louver shutter. 3,991,518, Cl. 49-75.000.

Ishii, Hajime: *See—*
Maruyama, Toshiro; Hirosawa, Matsuo; Ishii, Hajime; and Sato, Hiroaki, 3,991,451.

Ishizawa, Kazutomo; and Sawa, Yoshio, to Kanegafuchi Boseki Kabushiki Kaisha. Process for finishing textured knitted fabrics. 3,991,449, Cl. 28-72.00R.

Ishizuka, Masaaki: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Takamatsu, Akira; Oki, Toshikazu; and Tone, Hiroshi, 3,992,524.

Isono, Katsuo, to Sony Corporation. Locked oscillator having control signal derived from output and delayed output signals. 3,992,679, Cl. 331-1.00R.

Istituto Farmacologico Serono S.p.A.: *See—*
Donini, Pietro, 3,992,514.

Itek Corporation: *See—*
Genthe, James E.; and Buchan, William R., 3,991,712.
Wirtz, John S., 3,992,098.

ITL Technology Inc.: *See—*
Eaton, Thomas, 3,991,972.

Ito, Shigehiko: *See—*
Kawai, Mitsuo; and Ito, Shigehiko, 3,991,726.

Itoh, Kunio; Yoshida, Takeo; and Fujiki, Hironao, to Shinetsu Chemical Company. Heat-curable organopolysiloxane compositions. 3,992,355, Cl. 260-46.5UA.

Iwasa, Hitoo; and Kano, Gota, to Matsushita Electric Industrial Co., Ltd. Apparatus to prevent overcurrent or overvoltage. 3,992,650, Cl. 317-33.00R.

Iwasaki, Takao: *See—*
Kadowaki, Takashi; Iwasaki, Takao; Matsumura, Hideki; and Abe, Koichi, 3,992,461.

Izawa, Akio: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.

Izumisawa, Masato: *See—*
Yamada, Mitsuyoshi; Hatada, Hideo; Izumisawa, Masato; Machida, Hiromasa; and Furuyama, Norihide, 3,992,647.

J. B. Foote Foundry Co., The: *See—*
Helmick, Michael H.; and Hauser, Hans, 3,992,042.

J. M. Voith GmbH: *See—*
Schiel, Christian, 3,992,253.

Jackson, E. L.: *See—*
Cartmill, William Glenn, 3,991,470.

Jackson, Harold L., to Du Pont de Nemours, E. I., and Company. Migration-free textile drying. 3,992,144, Cl. 8-174.000.

Jackson, Harold L.: *See—*
Coraor, George R.; Jackson, Harold L.; and Mader, Frederick W., 3,991,481.

Jacob, Robert A.: *See—*
Lagow, Richard J.; Gerchman, Lois L.; and Jacob, Robert A., 3,992,424.

Jacobs Manufacturing Company Limited, The: *See—*
Derbyshire, George Cecil, 3,992,020.

Jacoby, Jerold L.; and Williamson, Clyde E., to TRW Systems & Energy. Optics module for borehole stress measuring instrument. 3,992,095, Cl. 356-32.000.

Jacquet, Bernard; Papantoniou, Christos; Dufaure, Pierre; and Mahieux, Claude, to Societe Anonyme dite: L'Oreal. Anti-solar polymers and copolymers from vinyloxycarbonyl-methyl 4-N,N-dimethylamino benzoate and vinyloxycarbonyl-methyl-4-methoxy cinnamate monomeas, method of making the same and cosmetic compositions containing the same. 3,992,356, Cl. 260-47.0UA.

Jacuzzi Bros. Incorporated: *See—*
Childress, Bruce D., 3,992,130.

Jaffe Acoustics, Inc.: *See—*
Jaffe, Christopher, 3,992,586.

Jaffe, Christopher, to Jaffe Acoustics, Inc. Boardroom sound reinforcement system. 3,992,586, Cl. 179-1.0AT.

Jakobson, Hans, to Lumoprint Zindler KG. Apparatus for the preparation of copies during both directions of relative movement of an original. 3,992,093, Cl. 355-51.000.

James, Michael Joseph, to Global Castors and Hardware Limited. Ball castor. 3,991,434, Cl. 16-18.00A.

Jania, Joseph M.: *See—*
Dunn, Robert C.; and Jania, Joseph M., 3,992,070.

Jansen, Gerhard: *See—*
Trieschmann, Hans-Georg; Rosewicz, Horst; Jansen, Gerhard; and Ballweber, Dieter, 3,992,277.

Japan Analytical Industry Co. Ltd.: *See—*
Nakamura, Sigeru; Taguchi, Mitsuru; Naniwada, Satoru; and Ohguri, Naoki, 3,992,174.

Japan Gasoline Co., Ltd.: *See—*
Okagami, Akio; Furuta, Akio; and Nakamura, Toshikazu, 3,992,166.

Jarsen, Dieter: *See—*
Mohrke, Klaus; Eggert, Heinrich; Franz, Helmut; and Jarsen, Dieter, 3,991,758.

Jeffrey, William B.; Frill, Richard K., deceased; and Frill, Patricia R., executrix, to Westinghouse Air Brake Company. Combination fluid pressure and electric trip cock emergency brake apparatus for railway vehicles. 3,992,062, Cl. 303-3.000.

Jenewein, Norman, to Amana Refrigeration, Inc. Refrigerator freezer forced air system. 3,992,171, Cl. 62-419.000.

Jensen, Gerald A., to Pako Corporation. Mounting device for printing copying camera. 3,992,097, Cl. 355-56.000.

Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Patrick, Richard M.; Friedman, Herbert W.; and McCloskey, John W., 3,992,684.
Schmidt, George; Halpern, Gerald M.; and Thomas, William R. L., 3,992,625.

Jessee, Karl E., to Active Enterprises, Inc. Heads down golf practice device. 3,992,011, Cl. 273-183.00A.

Jobson, Ronald B.: *See—*
Utne, Torleif; Jobson, Ronald B.; and Lovell, Alfred V., 3,992,459.

John Thomas Batts, Inc.: *See—*
DeMaagd, Howard E.; and Sloan, Thomas W., 3,991,884.

John Wyeth & Brother Limited: *See—*
Archibald, John Leheup; and Heatherington, Kenneth, 3,992,544.
Cavalla, John Frederick; and Archibald, John Leheup, 3,992,389.
Curran, Adrian Charles Ward, 3,992,383.

Johns, Herman S., to Medical Specialties, Inc. Method for molding a protective pad. 3,992,238, Cl. 156-93.000.

Johnsen & Jorgensen (Plastics) Ltd.: *See—*
Davis, Eugene Edward; and Miskin, Brian Leslie, 3,991,904.

Johnson, Gordon Carlton; Metzler, Richard Bruce; and Bailey, Donald Leroy, to Union Carbide Corporation. Quadripolymer siloxanes containing Si-H bonds. 3,992,426, Cl. 260-448.20H.

Johnson, Howard L., to Caterpillar Tractor Co. Fluid system of a work vehicle having fluid combining means and signal combining means. 3,991,571, Cl. 60-422.000.

Johnson, Vernon S. Composition for indicating and method of removing dental undercuts and the like. 3,992,515, Cl. 424-7.000.

Johnson, Wilfred V., to U.S. Fire Control Corporation. Delayed closing fire sprinkler heads. 3,991,829, Cl. 169-19.000.

Jolin, Jacques R. Electrically heated hot water system. 3,992,607, Cl. 219-314.000.

Jones, Edward H.: *See—*
Lamb, John K.; and Jones, Edward H., 3,991,484.

Jones, Eugene C.: *See—*
Puckett, Dennis E.; Heatherington, Dale A.; and Jones, Eugene C., 3,992,587.

Jones, John F.; and Dubrow, Bernard, to TRW Systems and Energy. Method for the preparation of moldable filled polymetal acrylate. 3,992,348, Cl. 260-30.60R.

Jones, Philip Graham: *See—*
Gordon, Stuart; Evans, Geoffrey Ian; and Jones, Philip Graham, 3,991,565.

Jones, Richard F., to General Aquadyne, Inc. Helmet with actuated neck pad. 3,991,423, Cl. 2-415.000.

Jones, William, to Raymond Lee Organization, Inc., The, a part interest. Submersible pump boom. 3,991,978, Cl. 254-139.000.

Jos. Schlitz Brewing Company: *See—*
Sawicki, John E.; and Murdock, James P., 3,992,293.

Josten's, Inc.: *See—*
Voegele, Lawrence R., 3,991,809.

Joy, Ivan L. Siren detector. 3,992,656, Cl. 317-147.000.

Joy Manufacturing Company: *See—*
Bailey, Edward A.; and Fish, Walter D., 3,991,835.
Crickmer, Charles D., 3,991,837.
Rollins, Lester G., 3,992,061.

Juguin, Bernard; Cohen, Georges; and Mikitenko, Paul, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Process for manufacturing and separating from petroleum cuts aromatic hydrocarbons of high purity. 3,992,465, Cl. 260-668.00D.

Juguin, Bernard: *See—*
Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, 3,992,468.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Komatsu, Mitsuaki, 3,991,865.

Kabushiki Kaisha Nihon Keiki Seisakusho: *See—*
Narita, Shizuo, 3,991,628.

Kabushiki Kaisha Suwa Seikosha: *See—*
Aizawa, Susumu; Futagawa, Yoshikiyo; and Kuriya, Katsumi, 3,991,671.
Yamazaki, Yoshio, 3,992,081.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Tashiro, Ichiro; Motobayashi, Kozo; Kamiya, Kazuo; Yoshizawa, Toshio; and Yamada, Yasuo, 3,991,950.

Kadokawa, Toshiaki: *See—*
Uno, Hitoshi; Nakano, Junji; and Kadokawa, Toshiaki, 3,992,391.

Kadowaki, Takashi; Iwasaki, Takao; Matsumura, Hideki; and Abe, Koichi, to Denki Kagaku Kogyo Kabushiki Kaisha. Method of producing chloroprene. 3,992,461, Cl. 260-655.000.

Kaduk, Edward E., to General Electric Company. Magnesium aluminate gallate phosphors and reprographic lamp containing same. 3,992,645, Cl. 313-486.000.

Kageyama, Osamu; Kai, Manabu; Mitani, Tadayuki; Asahi, Akira; and Sasaki, Sadao, to Daicel, Ltd. Process for the continuous production of sorbic acid. 3,992,442, Cl. 260-526.00N.

Kahan, William; Rupinski, Fredrick Alexander; Hunts, Barney Dean; Rogers, Howard David; Wagner, John Francis; and Landau, John Vernon, Jr., to Singer Company, The. Automated home knitting machine. 3,991,592, Cl. 66-75.00A.

Kahle Engineering Co.: *See—*
Napor, Carl A.; and Milana, Anthony A., 3,991,927.

Kahling, Joachim: *See—*
Kleemann, Manfred; Kahling, Joachim; Griss, Gerhart; and Hurnaus, Rudolf, 3,992,536.

Kahn, Paul: *See—*
Miller, George E., Jr.; Kahn, Paul; and Dabney, William C., 3,991,767.

Kai, Manabu: *See—*
Kageyama, Osamu; Kai, Manabu; Mitani, Tadayuki; Asahi, Akira; and Sasaki, Sadao, 3,992,442.

Kaiser Aluminum & Chemical Corporation: *See—*
Bohne, Philip W.; Cuccia, Michael R.; and Moughon, Tom S., Jr., 3,992,176.

Kaji, Tadao; Yumoto, Osamu; and Suzuki, Michio, to Hitachi, Ltd. Method of manufacturing semiconductor device having oxide isolation structure and guard ring. 3,992,232, Cl. 148-175.000.

Kajii, Shigeru, to Hochiki Corporation. Photoelectric smoke detector with means for adjusting the amount of light projected into the detection region. 3,992,102, Cl. 356-103.000.

Kakehashi, Ikutaro, to Roland Corporation. Arpeggio circuit for an electronic musical instrument. 3,991,646, Cl. 84-1.240.

Kamber, Walter: *See—*
Roulier, Alfred; and Kamber, Walter, 3,992,111.

Kambic, Stanley F.: *See—*
Dym, Herbert; and Kambic, Stanley F., 3,992,579.

Kamibayashi, Akira: *See—*
Suzuki, Hideo; Yoshida, Harumi; Ozawa, Yoshiko; Kamibayashi, Akira; Sato, Munetaka; Mori, Atsushi; and Endo, Makoto, 3,992,260.

Kamiya, Kazuo: *See—*
Tashiro, Ichiro; Motobayashi, Kozo; Kamiya, Kazuo; Yoshizawa, Toshio; and Yamada, Yasuo, 3,991,950.

Kamosaki, Minoru; and Asai, Sigeru, to Daicel, Ltd. Paint composition dispersible in water and water base paint. 3,992,478, Cl. 260-857.0UN.

Kamyr A.B.: *See—*
Chaudhuri, Punya B.; and Norberg, Nils G., 3,992,250.

Kanak, Ernest, Jr., to UOP Inc. Thermal insulations in acid-catalyzed alkylation process. 3,992,475, Cl. 260-683.480.

Kanazawa, Toshio: *See—*
Toyama, Akira; Nakako, Yukio; and Kanazawa, Toshio, 3,992,168.

Kane, William C. Conference desk. 3,992,067, Cl. 312-194.000.

Kane, William S.: *See—*
Cardwell, Paul H.; and Kane, William S., 3,992,507.

Kanegafuchi Boseki Kabushiki Kaisha: *See—*
Ishizawa, Kazutomo; and Sawa, Yoshio, 3,991,449.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Kosugi, Takumi; Yasunaga, Shigeki; and Motoki, Takashi, 3,992,485.

Kano, Gota: *See—*
Iwasa, Hitoo; and Kano, Gota, 3,992,650.

Kantz, Dieter, to Siemens Aktiengesellschaft. Arrangement for writing-in binary signals into selected storage elements of an MOS-store. 3,992,704, Cl. 340-173.0CA.

Kao Soap Co., Ltd.: *See—*
Minegishi, Yutaka; and Arai, Haruhiko, 3,992,304.

Kaplow, Roy, to Data Packaging Corporation. Permanent magnet. 3,992,689, Cl. 335-302.000.

Kapp, J. Lehman. Woven endless belt of a spliceless and Mobius strip construction. 3,991,631, Cl. 74-231.0MB.

Kariya, Noboru: *See—*
Ariyoshi, Junji; and Kariya, Noboru, 3,992,433.

Karl Schmidt GmbH: *See—*
Diez, Adolf; Stark, Manfred; and Anderko, Kurt, 3,991,811.

Karney, James L., to United States of America, Navy. Countermeasure system for laser radiation. 3,992,628, Cl. 250-338.000.

Karnofsky, George B., to Dravo Corporation. Method and apparatus for melting ice in saline water conversion systems. 3,992,170, Cl. 62-535.000.

Karpowicz, John F., to Amerel Corporation. Music teaching device. 3,991,648, Cl. 84-470.000.

Kartscher, Gunther: *See—*
Bechtold, Leander; and Kartscher, Gunther, 3,992,658.

Kartte, Klaus: *See—*
Gath, Rudolph Hans; Fuchs, Hugo; Schmitz, Ruediger; Kartte, Klaus; and Brand, Uwe, 3,992,372.

Katahira, Yukio, to Nihon Beru-Haueru Kabushiki Kaisha (Bell and Howell Japan, Ltd.). Shuttle speed control device. 3,992,305, Cl. 352-14.000.

Katsuda, Yoshio, to Dainippon Jochugiku Kabushiki Kaisha. 5-Ethoxymethyl furfuryl ester of chrysanthemumic acid and its use as an insecticide. 3,992,526, Cl. 424-285.000.

Katsuoka, Ritsu: *See—*
Kawai, Hisasi; and Katsuoka, Ritsu, 3,991,727.

Katz, Helmut, to Siemens Aktiengesellschaft. Compound liquid crystal indicator screen. 3,992,082, Cl. 350-160.0LC.

Katz, Martin, to Syntex Corporation. Analgesic formulations having enhanced therapeutic activity. 3,992,541, Cl. 424-260.000.

Kaufman, Murlan R.: *See*—
Vernon, Jack A.; Kaufman, Murlan R.; Brummett, Robert E.; and Bender, Herman G., 3,991,755.

Kawai, Hisasi; and Katsuoka, Ritsu, to Nippon Soken, Inc. Electronically controlled fuel injection system. 3,991,727, Cl. 123-32.0EA.

Kawai, Mitsuo; and Ito, Shigehiko, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Electronically controlled fuel injection system. 3,991,726, Cl. 123-32.0EA.

Kawai, Teiichi, to Kubota, Ltd. Apparatus for mixing different kinds of metallic material. 3,991,988, Cl. 266-216.000.

Kawano, Yasuhiko: *See*—
Kawashima, Kenya; Saraie, Takahiro; Kawano, Yasuhiko; and Ishiguro, Toshihiro, 3,992,370.

Kawarabayashi, Susumu: *See*—
Matsui, Isamu; Sakai, Shoji; Tsukada, Susumu; and Kawarabayashi, Susumu, 3,991,894.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; and Tamba, Shinichi, 3,991,722.

Kawashima, Kenya; Saraie, Takahiro; Kawano, Yasuhiko; and Ishiguro, Toshihiro, to Takeda Chemical Industries, Ltd. 1,1-Dichloro-1a,1b-dihydrodibenzo(b,f)cycloprop(d)azepine-6(1H)-carboxaldehyde. 3,992,370, Cl. 260-239.00D.

Kawashima, Yoshichi; Masuda, Hiroiku; and Mitsueda, Hisami, to Nippondenso Co., Ltd. Frequency-current conversion circuit. 3,992,660, Cl. 321-6.000.

Kayser, Detlev: *See*—
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 3,992,386.

Kaziz, Claude: *See*—
Antonini, Albert; Kaziz, Claude; and Wetroff, Georges, 3,992,462.

Keck, Erich, to Siemens Aktiengesellschaft. Rotary armature solenoid. 3,992,688, Cl. 335-272.000.

Keith, Stephen G.; Casey, Charles J.; Burke, Edward F., Jr.; and Apostoles, John L., to MFE Corporation. Line printer for printing information on tickets. 3,991,672, Cl. 101-99.000.

Keller, James E., to Western Fluid Power Corporation. Hydraulic accumulator pressure release valve and system. 3,991,570, Cl. 60-413.000.

Keller, James R.; and Nickerson, William A. Pressed-in dovetail type joint. 3,991,535, Cl. 52-642.000.

Kelley, Fred W., Jr., to General Electric Company. Reactive current compensating apparatus for electric power systems. 3,992,661, Cl. 323-102.000.

Kelling, Robert L.: *See*—
McVey, Charles I.; and Kelling, Robert L., 3,992,642.

Kemanord Aktiebolag: *See*—
Larsson, Karl-Georg, 3,992,279.

Kemker, Karl. Mixing faucet. 3,991,427, Cl. 4-192.000.

Kennedy, Jerry L. Weight and balance calculator. 3,992,610, Cl. 235-61.00T.

Kercso, Josef E., to Syntex (U.S.A.) Inc. Means for supporting an object during radiographic analysis. 3,992,630, Cl. 250-360.000.

Kerimov, Jusif Museibovich; and Zaltsberg, Leib Aronovich. Aerodynamic aerial conductor vibration damper. 3,992,566, Cl. 174-42.000.

Kern, Jorg: *See*—
Mayer, Fritz; Kern, Jorg; and Nachbur, Hermann, 3,992,560.

Kershner, Stuart D.; and Butler, David F., to United States of America, Army. Firearm sight with dialable range control. 3,991,500, Cl. 42-1.00S.

Kertzscher, Claus: *See*—
Cotte, Dietrich; Scheffler, Holger; and Kertzscher, Claus, 3,991,591.

Kessler, Hans-Joachim: *See*—
Rufer, Clemens; and Kessler, Hans-Joachim, 3,992,374.

Kessler, Saul, to Aidlin, Joseph W. Protective coating for articles. 3,992,454, Cl. 260-590.00R.

Kettler, William C. Anti-siphon gasoline tank. 3,991,792, Cl. 138-108.000.

Kidd, Wayne L.; and Corona, Stephen C., to Xerox Corporation. Optical system alignment apparatus. 3,992,108, Cl. 356-172.000.

Kido, Yoshihiko: *See*—
Tsubuko, Kazuo; Nakagawa, Yukihiko; Matsubayashi, Kenichi; and Kido, Yoshihiko, 3,992,342.

Kierstead, Richard Wightman; Le Mahieu, Ronald Andrew; and Pruess, David, to Hoffmann-La Roche Inc. Antibiotic 1745A/X and methods for the production thereof. 3,992,264, Cl. 195-80.00R.

Kiffmeyer, William W., to Allen-Bradley Company. Digital input circuit with fault detection means. 3,992,636, Cl. 307-231.000.

Kimmel, David R.: *See*—
Bailey, Leo L.; and Kimmel, David R., 3,991,575.

Kimont, Edward L.: *See*—
van Erp, Jan B.; and Kimont, Edward L., 3,992,257.

Kimura, Susumu: *See*—
Nakagawa, Yasuhiko; Terasaka, Katsunori; Kimura, Susumu; and Yoshioka, Masanobu, 3,991,725.

King, David Philip: *See*—
Appleford, David Dale; and King, David Philip, 3,991,619.

Kinnavy, James W., to Continental Can Company, Inc. Aerosol container. 3,991,915, Cl. 222-394.000.

Kirsch Company: *See*—
Ford, James A., 3,991,435.

Kirschner, Leon I. Lightweight aggregate for concrete and method for making same. 3,992,216, Cl. 106-288.00B.

Kitterman, Gary. Food tray carrier. 3,992,069, Cl. 312-244.000.

Kitzing, Rainer: *See*—
Stauner, Thomas; and Kitzing, Rainer, 3,992,366.

Klapdar, Wilhelm; Richter, Helmut; Rommerswinkel, Heinrich-Wilhelm; Spetzler, Edgar; and Wendorff, Jochen, to Thyssen Niederrhein AG Hutten- und Walzwerke. Process for the production of steel with increased ductility. 3,992,195, Cl. 75-58.000.

Klaren, Dick Gerrit, to Pieper, Gustav Adolf. Method of exchanging heat and heat exchanger. 3,991,816, Cl. 165-1.000.

Kleemann, Manfred; Kahling, Joachim; Griss, Gerhart; and Hurnaus, Rudolf, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-phenyl-2,2,4,4-C_1-C_5 alkyl-3-[4-phenyl of pyridyl)-piperazino]-cyclobutanol-(1) and method of use. 3,992,536, Cl. 424-250.000.

Klem, Stanley J., to SCM Corporation. Automatic function mechanism for typewriters. 3,991,874, Cl. 197-91.000.

Klementi, Toe Jokhannesovich; Kruusimagi, Toivo Elmar-Jokhannesovich; and Veisserik, Juri Arturovich. Method of and device for chromatographic separation of fluid mixtures into fractions. 3,992,175, Cl. 55-67.000.

Klena, Robert S., to Aluminum Company of America. Machine for removing material. 3,991,651, Cl. 90-13.00R.

Kling, Harry C., to International Telephone and Telegraph Corporation. Method of separating articles having different specific gravities. 3,992,288, Cl. 209-3.000.

Kloepfer, Henry L., to Lear Siegler, Inc. Seat edge construction. 3,992,059, Cl. 297-452.000.

Knaak, Joachim Friedrich, to Du Pont de Nemours, E. I., and Company. γ-CrOOH fluorination catalysts. 3,992,325, Cl. 252-442.000.

Knab, John L.; and McIntyre, John J., to Scan-Data Corporation. Character recognition system utilizing feature extraction. 3,992,697, Cl. 340-146.3MA.

Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, to Canon Kabushiki Kaisha. Photographic copying apparatus. 3,991,483, Cl. 34-95.000.

Knibbe, Jan C., to Springfield Tool & Die, Inc. Piercing apparatus. 3,991,641, Cl. 83-440.100.

Knight, Mark Berwyn, to RCA Corporation. Current amplifiers. 3,992,676, Cl. 330-18.000.

Knock-N-Lok International, Inc.: *See*—
Solo, Alan J., 3,991,963.

Knollmueller, Karl O., to Olin Corporation. Alkoxysilane multiple cluster compounds and their preparation. 3,992,429, Cl. 260-448.80A.

Kobayashi, Shigeo: *See*—
Koga, Issac; Okamoto, Isao; and Kobayashi, Shigeo, 3,992,664.

Kobayashi, Susumu; and Nishimoto, Taibun, to Yoshida Kogyo Kabushiki Kaisha. Turret press. 3,991,642, Cl. 83-559.000.

Kobe Steel Ltd.: *See*—
Toyama, Akira; Nakako, Yukio; and Kanazawa, Toshio, 3,992,168.
Ureshino, Kashirou, 3,991,949.

Kockum Industri Aktiebolag: *See*—
Palmquist, Harry Oskar, 3,991,800.

Kockum Industries, Inc.: *See*—
Boge, Dallas F., 3,991,637.

Koegel, Wolfram: *See*—
Tatzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arndt Christian, 3,992,501.

Koehring Company: *See*—
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Koenig, Karl-Heinz: *See*—
Hamprecht, Gerhard; Mangold, Dietrich; and Koenig, Karl-Heinz, 3,992,444.

Koepnick, Glenn; Balzen, Richard T.; and Etherton, Billy D., to Etherton, Billy D.; Ziner, Eugene P.; Berry, William E.; and Horn, Russell J. Liquid conductivity measuring device. 3,992,662, Cl. 324-30.00R.

Koga, Issac; Okamoto, Isao; and Kobayashi, Shigeo, to Kokusai Denshin Denwa Kabushiki Kaisha. Method for measuring parameters of quartz crystal unit and a non-reactive constant resistance element for carrying out the same. 3,992,664, Cl. 324-56.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
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Michishita, Hisakichi; Yanagidaira, Hidetaka; and Furuya, Katsuhiko, 3,992,673.
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 3,992,572.

Kolb, Alfred Reeves, to Brown & Root, Inc. Method and apparatus for handling piling and anchoring an offshore tower. 3,991,581, Cl. 61-53.500.

Kolb, Lothar, to Gebr. Klockner KG. Centrifugal mill. 3,991,945, Cl. 241-55.000.

Komatsu, Mitsuaki, to Kabushiki Kaisha Komatsu Seisakusho. Device for gradually increasing hydraulic pressure. 3,991,865, Cl. 192-109.00F.

Komatsu, Toshiaki: *See*—
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.

Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method for surface treatment of electrode in distributor of internal combustion engine for suppressing noise. 3,992,230, Cl. 148-6.300.

Komori, Masanoshin: *See*—
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Kondo, Eiichi: *See—*
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Kondo, Katsumi: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 3,992,230.

Konig, Wolfgang; Zwisler, Oswald; and Guthorlein, Gerhard, to Hoechst Aktiengesellschaft. Method of treating excessive fibrinolysis with synthetically modified trypsin inhibitors. 3,992,529, Cl. 424-177.000.

Koninklijke Emballage Industrie Van Leer B.V.: *See—*
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Konno, Koji: *See—*
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Konstruktiewerkhuize DeMets N.V.: *See—*
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Koo, Ronald C.; and Shurgan, Joel, to Duro-Test Corporation. Filaments for fluorescent lamps. 3,992,201, Cl. 75-207.000.

Koolaj-Es Foldgazbanyaszati Ipari Kutato Laboratorium: *See—*
Rakar, Geza; Toth, Zoltan; and Zsoka, Istvan, 3,991,610.

Kopp, Joseph N.; and Morris, Bruce V., to Quaker Oats Company, The. Apparatus for manufacturing cores and molds with pressurized staging hoppers. 3,991,812, Cl. 164-200.000.

Koppel, Gary A.: *See—*
Chauvette, Robert R.; and Koppel, Gary A., 3,992,377.

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Korger, Heinz, to Marker, Hannes. Safety ski-binding. 3,992,031, Cl. 280-618.000.

Korhumel Industries, Inc.: *See—*
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Kornfeld, Edmund C.: *See—*
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Kosugi, Takumi; Yasunaga, Shigeki; and Motoki, Takashi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparation of weather resistant and impact resistant resins. 3,992,485, Cl. 260-881.000.

Kotheimer, William C.; and Wilkinson, Stanley B., to General Electric Company. Current differential fault detection circuit. 3,992,649, Cl. 317-26.000.

Kotuby, Paul M.; Pettersen, Edward A.; and Velicka, Alvydas, to Risdon Manufacturing Company, The. Easily assembled, leakproof liquid dispensing pump. 3,991,914, Cl. 222-321.000.

Koura, Kobuyuki: *See—*
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Kovacs, Louis E., to Vitamins, Inc. Supplemented food product and process for preparing same. 3,992,555, Cl. 426-72.000.

Kovacs, Louis E.; and Vondell, Richard Merriam, to Vitamins, Inc. Supplemented food product. 3,992,556, Cl. 426-72.000.

Kovats, Laszlo I., to General Motors Corporation. Self-leveling mechanism. 3,991,962, Cl. 248-188.500.

Koziatek, Jerome P.; and Wildgen, Leo F., to Questor Corporation. Car seat. 3,992,056, Cl. 297-250.000.

Koziol, Konrad: *See—*
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Kracke, Jurgen; Miemietz, Hans-Peter; Derichs, Wilfried; Richer, Werner; and Stadelmann, Johann, to Gebruder Sucker. Traversing device for winding a thread bunch on a warp beam. 3,991,448, Cl. 28-37.000.

Kradel, Juergen: *See—*
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Kraft, Derald H., to Aspro, Incorporated. Method of roller spinning cup-shaped metal blanks. 3,991,598, Cl. 72-83.000.

Kraft, Joseph K.; and Courson, Iber C., to Westinghouse Electric Corporation. Transportation apparatus. 3,991,877, Cl. 198-335.000.

Kraft, Paul; and Altscher, Siegfried, to Stauffer Chemical Company. Fire retardant thermoplastic polymer compositions. 3,992,337, Cl. 260-17.00R.

Kraft, Paul; and Altscher, Siegfried, to Stauffer Chemical Company. Fire retardant thermoplastic polymer compositions. 3,992,481, Cl. 260-873.000.

Kraft, Paul; and Altscher, Siegfried, to Stauffer Chemical Company. Fire retardant thermoplastic polymer compositions. 3,992,482, Cl. 260-876.00R.

Krakow, Heinz, to Blohm & Voss AG. Method and device for adjusting forming rolls in a helical seam pipe mill. 3,991,597, Cl. 72-12.000.

Krallinger, Robert E.: *See—*
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Kraus, Hans; and Willhite, Wesley R., Jr. Electrically heated parting tool for removing windshields. 3,992,605, Cl. 219-233.000.

Krauss, Hans. System for rapidly building an air cushion over liquid in a tank. 3,991,783, Cl. 137-209.000.

Krautkramer-Branson, Incorporated: *See—*
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Krebs, Jacob, to Shatterproof Glass Corporation. Oven doors. 3,991,738, Cl. 126-200.000.

Krei, Joyce Ruth: *See—*
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Krishnan, Ram M., to Goodyear Tire & Rubber Company, The. Method for using mold release. 3,992,502, Cl. 264-129.000.

Kroker, Ruprecht: *See—*
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Kruder, George A.; and Nichols, Russell J., to Koehring Company. Vented extruder. 3,992,500, Cl. 264-102.000.

Kruger, Horst: *See—*
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Kruger, William P.; and Michnowicz, John A., to Hewlett-Packard Company. Multiconfiguration ionization source. 3,992,632, Cl. 250-423.00R.

Krumbach, Guenter F., to Communication Mfg. Co. First-in/first-out data storage system. 3,992,699, Cl. 340-172.500.

Kruusimagi, Toivo Elmar-Jokhannesovich: *See—*
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Kubo, Shunichi; Aoki, Takao; Kondo, Eiichi; and Inoue, Shunzo, to Canon Kabushiki Kaisha. Image transfer method. 3,992,557, Cl. 427-24.000.

Kubota, Ltd.: *See—*
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Kuegler, Eberhard, to Siemens Aktiengesellschaft. Frequency multiplex system for transmission of telephone and videophone channels. 3,992,589, Cl. 179-15.0FS.

Kuehn, Riley, Jr., to Boeing Company, The. Method and apparatus for fabricating elongate laminated structures. 3,992,240, Cl. 156-250.000.

Kuhla, Donald E., to Pfizer Inc. 6-Amino-2,2-dimethyl-3-(5-tetrazolyl)penam process and intermediates therefor. 3,992,394, Cl. 260-306.70R.

Kuhla, Donald E.: *See—*
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Kuhlmey, Walter. Physiologically active polypeptide preparation. 3,992,364, Cl. 260-112.00R.

Kull, Leo, to Coffee-Mat Corporation. Fluid flow distributor for multichoice vending machine. 3,991,788, Cl. 137-608.000.

Kull, Leo. Solid merchandise dispensing system for mechanical or electrical control. 3,991,907, Cl. 221-84.000.

Kumai, Teruo: *See—*
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Kume, Kiyoshi: *See—*
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Kumpfel, Josef: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kyowa Electric & Chemical Co., Ltd.: *See—*
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Lagow, Richard J.; Gerchman, Lois L.; and Jacob, Robert A., to Massachusetts Institute of Technology. Trifluoromethyl-substituted compounds. 3,992,424, Cl. 260-429.100.

Laine, Francois: *See—*
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Laird, Cleve Watrous; and Matsu, Noboru, to Block Engineering, Inc. Alignment device for sample containers. 3,991,627, Cl. 73-423.00R.

Lamb, John K.; and Jones, Edward H., to Cincinnati Printing and Drying Systems, Inc. Machine for drying printed matter by ultraviolet radiation. 3,991,484, Cl. 34-162.000.

Lamb, William Edward: *See—*
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Lamberts, Robert L., to Eastman Kodak Company. Method of making lenticular surfaces. 3,992,206, Cl. 96-35.000.

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Lang, E. Reed, to Rohm and Haas Company. Process for altering appearance of polymer by incorporating therein crosslinked particulate polymers prepared by endopolymerization. 3,992,486, Cl. 260-885.000.

Lang-Ree, Nils; Nilsson, Kurt; Hemborg, Goeran; and Green, Winje, to N.P.I. Corporation. Meatball cooker. 3,991,665, Cl. 99-441.000.

Langbein, Adolf; Merz, Herbert; Walther, Gerhard; and Stockhaus, Klaus, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing an N-(furyl-methyl)-6,14-(endoethano or endoetheno)-7α-hydroxyalkyl-tetrahydro-noroipavine or -northebaine and method of use. 3,992,542, Cl. 424-260.000.

Lange, Frederick F.: *See—*
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Langenfeld, Michel, to Pont-A-Mousson S.A. Remote adding and reading device for a meter. 3,992,705, Cl. 340-203.000.

Lann, Claude L. Automatic hook setting fish rod holder. 3,991,503, Cl. 43-15.000.

LaPointe, Roger F. Remote shift. 3,991,845, Cl. 180-77.00R.

Large, George B., to Stauffer Chemical Company. Acaricidal and lepidoptericidal active carbon-imidothioates. 3,992,447, Cl. 260-564.00E.

Larsen, Lyle Vernon, to Chicago Bridge & Iron Company. Movable vacuum secured apparatus for inclined or vertical surfaces. 3,991,842, Cl. 180-1.0VS.

Larson, Willis A., to Magic Dot, Inc. Touch actuated electronic switch including protection from high potential electricity. 3,992,634, Cl. 307-116.000.

Larsson, Karl-Georg, to Kemanord Aktiebolag. Electrode assembly. 3,992,279, Cl. 204-288.000.

Larsson, Sven Gunnar Olof, to Gunnebo Bruks Aktiebolag. Loading magazine. 3,991,501, Cl. 42-88.000.

Laskaris, Evangelos T., to General Electric Company. Method of supplying cryogenic fluid through a transfer joint employing a stepped bayonet relative-motion gap. 3,991,587, Cl. 62-55.000.

Laskaris, Evangelos T., to General Electric Company. Cryogenic fluid transfer joint employing a stepped bayonet relative-motion gap. 3,991,588, Cl. 62-55.000.

Latimer, Eugene E.; and Lorimor, Larry W., to Caterpillar Tractor Co. Method for supplying unaerated hydraulic fluid to a work system. 3,991,568, Cl. 60-327.000.

Laughlin, Richard H., to Varo, Inc. Source discriminator for measuring angle of arrival and wavelength of radiant energy. 3,992,099, Cl. 356-73.000.

Lavoie, Paul A.: *See—*
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Lear Siegler, Inc.: *See—*
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Leary, David E.: *See—*
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Leddy, James H. Electrically heated ice cream dispenser. 3,992,604, Cl. 219-227.000.

Lee, Allen W.: *See—*
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Lee Blacksmith, Inc.: *See—*
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Lee, Daniel C., Sr.: *See—*
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Lee, Kyu Ho, to Extracorporeal Medical Specialities Inc. Dialyzer baffle. 3,992,302, Cl. 210-321.00B.

Lee, Lin-Fa, to Du Pont de Nemours, E. I., and Company. Process for sheath-core cospun heather yarns. 3,992,499, Cl. 264-78.000.

Lee, Patrick P., to Integrated Dynamics Incorporated. Metering shock absorber with manual adjustment. 3,991,863, Cl. 188-289.000.

LeFevre, Clyde Eugene: *See—*
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Lefton, Benjamin B. Rail gun gauge assembly and method. 3,991,638, Cl. 83-50.000.

Legacy, Lloyd W.: *See—*
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Legueu, Paul Etienne Rene. Rigid chassis for air transportable vehicle. 3,992,027, Cl. 280-106.00R.

Lehtinen, Antti, to Valmet Oy. Structure for separating a web and wire in a paper machine. 3,992,254, Cl. 162-300.000.

Leisner, Ernst, to Robert Bosch G.m.b.H. Apparatus for combustion chamber treatment of metal articles. 3,992,138, Cl. 432-231.000.

Le Mahieu, Ronald Andrew: *See—*
Kierstead, Richard Wightman; Le Mahieu, Ronald Andrew; and Pruess, David, 3,992,264.

Lemarinel, Robert; Demarthe, Jean-Michel; and Gandon, Louis, to Imetal. Method of reclaiming nickel values from a nickeliferous alloy. 3,992,270, Cl. 204-113.000.

Le Martret, Odile: *See—*
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Le Minor, Leon, to Agence Nationale de Valorisation de la Recherche (ANVAR). Immunological product for the treatment of intestinal infections due to pathogenic enterobacteria of the infant. 3,992,521, Cl. 424-87.000.

Leo, Daniel A.: *See—*
Austrins, Andrievs; and Leo, Daniel A., 3,991,880.

Leonard, Randal K., to Frostline, Inc. Method and apparatus for packaging down. 3,991,910, Cl. 222-1.000

Le Page, Jean-Francois: *See—*
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Lerch, David W.: *See—*
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Leroy, Pierre; and Bastien, Jean, to Creusot-Loire. Method and apparatus for use in the treatment of metals in the liquid state. 3,992,194, Cl. 75-52.000.

Le Sech, Alain: *See—*
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Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 5,8-Dihydro-5-oxo-2-(4-or 3-pyridinyl)pyrido[2,3-d]pyrimidine-6-carboxylic acids and esters. 3,992,380, Cl. 260-256.40F.

Leston, Gerd, to Koppers Company, Inc. Preparation of 5-sec-alkyl-m-cresol. 3,992,455, Cl. 260-619.00R.

Leto, Anthony, to Curtiss-Wright Corporation. Dual-fuel feed system for a gas turbine engine. 3,991,561, Cl. 60-39.46R.

LeVeen, Harry H. Method for treating benign and malignant tumors utilizing radio frequency, electromagnetic radiation. 3,991,770, Cl. 128-413.000.

Lever Brothers Company: *See—*
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Lewandowski, Edward F.: *See—*
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Lewis, Paul A., to Union Carbide Corporation. Seed coating. 3,991,517, Cl. 47-57.600.

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Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
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Liebenow, Walter Otto; and Prikryl, Jaroslav, to Ludwig Heumann & Co. GmbH. 4-Alkyldioxyalkylene-5-benzylpyrimidines. 3,992,379, Cl. 260-256.40N.

Lieser, Mathias J., to Stanray Corporation. Method of forming valve bodies. 3,991,456, Cl. 29-157.10R.

Lim, Sook Kyung. Direct fluorescent antibody composition and method for *P. Pneumocystis carinii*. 3,992,516, Cl. 424-8.000.

Lin, Shou S.: *See—*
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Lind, Hanns; Hugi, Rolf; and Brunetti, Heimo, to Ciba-Geigy Corporation. 3,5-dialkyl-4-hydroxybenzyl-oxiranes. 3,992,420, Cl. 260-348.00R.

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Lipford, John T.: *See—*
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Lipowski, Stanley A., to Diamond Shamrock Corporation. Process of making wet strength paper containing mono primary polyamine and organic dihalide modified, epoxidized polyamide. 3,992,251, Cl. 162-164.0EP.

Liquid Processing Systems, Inc.: *See—*
Cook, Danny G., 3,992,290.

Litke, William R.; and Haberski, Richard J., to Curtiss-Wright Corporation. Multi-pass heat exchanger having finned conduits of polygonal configuration in cross-section. 3,991,823, Cl. 165-145.000.

Litton Industrial Products, Inc.: *See—*
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Livigni, Russell Anthony: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 3,992,561.

Lieres, Jean; Martin, Jean-Paul; Perona, Maurice; and Venot, Robert, to Commissariat a l'Energie Atomique. Core support system for a fast reactor. 3,992,256, Cl. 176-40.000.
Lloyd, Henry: *See—*
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Loctite Corporation: *See—*
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Longshore, Donald W., to Allis-Chalmers Corporation. Countershaft auxiliary transmission. 3,991,634, Cl. 74-745.000.
Lonngren, Per-Lennart, to AGA Aktiebolag. Oxygen-fuel gas burner nozzle. 3,991,940, Cl. 239-430.000.
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Lorimor, Larry W.: *See—*
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Loud, Norman D.; Swanson, H. Damon; and Rines, Robert H., to Allor Foundation. Penicillium-type molds and antimicrobial derivatives therefrom. 3,992,523, Cl. 424-114.000.
Loudon, John D., to Cryogenic Technology, Inc. Refrigerated cryogenic envelope. 3,992,169, Cl. 62-55.000.
Lovatt, William John, to Acme Marls Limited. Support assembly for supporting pottery articles. 3,992,139, Cl. 432-258.000.
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Lowke, George E.; and Horvath, Bela Z., to Pfizer Inc. Detection of hepatitis B surface antigen by latex agglutination. 3,992,517, Cl. 424-12.000.
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MacLeay, Ronald Edward, to Pennwalt Corporation. Oxidation process for preparing α-hydroxyazo compounds. 3,992,368, Cl. 260-192.000.
MacSpadden, Floyd E.; Schellhase, Frank A.; Strong, Robert L.; and Tieden, Jansey D., to Boeing Company, The. Pneumatic fail-safe sensor system for N/C machine tool. 3,991,653, Cl. 90-62.00R.
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Marks, William M., to General Foods Corporation. Swatch cutting and binding apparatus and method. 3,991,926, Cl. 227-21.000.
Marone, Thomas E. Adjustable extraction pliers. 3,991,635, Cl. 81-420.000.
Maroski, Frank M., Jr. Combination archery bow stand, walking cane and animal dragging device. 3,991,780, Cl. 135-66.000.
Marshall, J. Howard, III; and Harrington, Timothy M., to MDH Industries, Inc. Digital telemetering system for subsurface instrumentation. 3,991,611, Cl. 73-151.000.

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Martin, Lawrence L.; and Westerberg, Robert C., to Minnesota Mining and Manufacturing Company. Prosthetic bone joint devices. 3,991,425, Cl. 3-1.910.
Martin, Le Roy, to Pennwalt Corporation. Friable tertiary amyl phenol sulfides as vulcanizing agent. 3,992,362, Cl. 260-79.50C.
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McMaster, Marjorie L. Decorative container. 3,991,931, Cl. 229-8.000.
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Plank, Charles J.; Rosinski, Edward J.; and Schwartz, Albert B., 3,992,466.
Rodewald, Paul Gerhard, 3,992,473.

Mocha, William J., to Air Power Systems Company, Inc. Three position fluid powered actuator. 3,991,661, Cl. 92-131.000.

Modine Manufacturing Company: *See*—
Cook, Neal A.; Costello, Norman F.; and Granetzke, Dennis C., 3,991,821.
Huggins, Homer D., 3,991,820.

Moen, Lenard E. Flexible stem valves selectively actuable by a common operator. 3,991,917, Cl. 222-486.000.

Mogi, Takaaki, to Nissan Motor Co., Ltd. Apparatus for detecting the fault of indicating lamps. 3,992,695, Cl. 340-60.000.

Mohon, Windell N.: *See*—
Derderian, George; Rodemann, Alfred H.; Mohon, Windell N.; and Pease, John W., 3,991,486.

Mohrke, Klaus; Eggert, Heinrich; Franz, Helmut; and Jansen, Dieter, to Boehringer Ingelheim GmbH. Pharmaceutical single-dose container. 3,991,758, Cl. 128-233.000.

Molins Limited: *See*—
Davies, Robert William, 3,991,662.

Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-ones. 3,992,404, Cl. 260-310.00A.

Molnar, John; and Schimpf, James E., to Caterpillar Tractor Co. Adjustable steering column assembly. 3,991,633, Cl. 74-493.000.

Molthen, Edward H., to Cubic Corporation. Electronic circuit board flat coil inductor. 3,992,691, Cl. 336-200.000.

Momiyama, Kikuo, to Canon Kabushiki Kaisha. Large aperture wide angle lens system employing an aspherical surface. 3,992,085, Cl. 350-189.000.

Monnet, Andre: *See*—
Bensa, Rene; Monnet, Andre; and Vincent, Gabriel, 3,992,350.

Monsanto Chemicals Limited: *See*—
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Monsanto Company: *See*—
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D'Amico, John J., 3,992,191.
Erickson, Floyd B., 3,992,209.
Luca, James J., 3,991,539.
Miles, James A.; and Beeny, Mark T., 3,992,273.

Mooney, Thomas; and Veselaski, Stephen, to I-T-E Imperial Corporation. One piece knock-out plug. 3,991,446, Cl. 24-73.00P.

Moore Business Forms, Inc.: *See*—
Huebschmann, John W.; Packard, H. Dean; and Swiercz, William D., 3,991,708.
Moore, Earl Phillip, Jr., to Du Pont de Nemours, E. I., and Company. 2-[(1-Cyano-1-methylethyl)azo]-2-methylpropionamide. 3,992,369, Cl. 260-192.000.
Moore, John D.: *See*—
Matthews, Merritt A.; and Moore, John D., 3,992,618.
Moorer, Donald K. Baby crawler. 3,992,023, Cl. 280-87.02R.
Moran, Robert J.; and Marsilia, Louis P., to Clinton Industries, Inc. Sewing machine drive control. 3,991,693, Cl. 112-219.00A.
Morgan, Thomas H. Secondary recovery system utilizing free plunger air lift system. 3,991,825, Cl. 166-68.000.
Morgan, Ward, to Health Kit Corporation. Water retractor. 3,991,473, Cl. 32-22.000.
Morgan, William Campbell: *See*—
Savitt, Jacob; and Morgan, William Campbell, 3,991,679.
Mori, Atsushi: *See*—
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Mori, Yoshihisa; Shimura, Kazuo; and Watanabe, Hiroyuki, to Sony Corporation. Pickup cartridge. 3,992,017, Cl. 274-37.000.
Moriyama, Masaru: *See*—
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Morlock, Gerhard: *See*—
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Kopp, Joseph N.; and Morris, Bruce V., 3,991,812.
Morris, Jack, to Olin Corporation. Metal tube having internal passages therein. 3,991,822, Cl. 165-140.000.
Morton, Michael John; Birchall, James Derek; and Cassidy, John Edward, to Imperial Chemical Industries Limited. Refractory fiber preparation with use of high humidity atmosphere. 3,992,498, Cl. 264-63.000.
Moser, Vincent J.: *See*—
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Meyerhoff, Jerry David, 3,992,674.
Moughon, Tom S., Jr.: *See*—
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Moyer, Norman E., to Hughes Aircraft Company. Digital timing circuit for display sequencing in two-digit wristwatch. 3,991,555, Cl. 58-50.00R.
Moyer, Norman E.: *See*—
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Moyer, Wendell W., Jr.: *See*—
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Sibrava, Joseph S., 3,991,975.
Mueller, Richard A., to G. D. Searle & Co. Dibenzoxazepine N-carboxylic acid hydrazines and derivatives. 3,992,375, Cl. 260-240.00J.
Mueller-Tamm, Heinz: *See*—
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Mulder, Jan, to U.S. Philips Corporation. Cold-gas refrigerator. 3,991,585, Cl. 62-6.000.
Muller, Erich, to Andreas Stihl Maschinenfabrik. Motor saw, especially motor chain saw. 3,991,864, Cl. 192-105.0BA.
Muller, Gerhard: *See*—
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Muller, Wolfgang: *See*—
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Munch, Heinrich, to Licentia Patent-Verwaltungs-G.m.b.H. Vaned hydraulic motor. 3,991,657, Cl. 91-411.00A.
Murata Kikai Kabushiki Kaisha: *See*—
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Murch, Robert M., to United States of America, Navy. Fire retardant polyester resins. 3,992,352, Cl. 260-45.9NP.
Murch, Robert M., to United States of America, Navy. Fire retardant polyester resins. 3,992,353, Cl. 260-45.9NP.
Murdock, James P.: *See*—
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Murdock, Lawrence C., to Westinghouse Electric Corporation. Marine instrument. 3,991,623, Cl. 73-170.00A.
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Musgrave, Charles R., III: *See*—
Cartmill, William Glenn, 3,991,470.
Muslin, Bernard J., to Specialty Connector Corporation. Flexible metal conduit with sealed end connectors. 3,992,044, Cl. 285-92.000.
Myers, David M., to Curtiss-Wright Corporation. Fuel injection system for rotary internal combustion engine. 3,991,723, Cl. 123-8.090.
N.P.I. Corporation: *See*—
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Nachbur, Hermann: *See*—
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Nagase, Mitsuo, to Yoshida Kogyo Kabushiki Kaisha. Butt hinge with means to prevent the wear of knuckles. 3,991,436, Cl. 16-136.000.
Nagase, Mitsuo, to Yoshida Kogyo Kabushiki Kaisha. Louver assembly. 3,991,533, Cl. 52-473.000.
Nagata, Masayoshi; Suzuki, Gyoji; and Tomotsu, Takeshi, to Fuji Photo Film Co., Ltd. Photo-sensitive etchant and method for forming metal image using same. 3,992,208, Cl. 96-36.000.
Nagin, Harold, to Reliance Steel Products Company. Aluminum-containing welded grating. 3,992,163, Cl. 29-191.600.
Nakagawa, Yasuhiko; Terasaka, Katsunori; Kimura, Susumu; and Yoshioka, Masanobu, to Nissan Motor Co., Ltd. Internal combustion engine having auxiliary combustion chambers. 3,991,725, Cl. 123-32.0SP.
Nakagawa, Yukihiko: *See*—
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Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, to Kokusai Denshin Denwa Kabushiki Kaisha. System for coding two-dimensional information. 3,992,572, Cl. 178-6.000.
Nakajima, Yukinobu: *See*—
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Nakako, Yukio: *See*—
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Nakamura, Sigeru; Taguchi, Mitsuru; Naniwada, Satoru; and Ohguri, Naoki, to Japan Analytical Industry Co. Ltd.; and Showa Denko Kabushiki Kaisha. Specimen capsule and process for gas chromatography. 3,992,174, Cl. 55-67.000.
Nakamura, Soichi, to Nippon Kogaku K.K. Zoom lens system also capable of ultra-closeup photography. 3,992,084, Cl. 350-186.000.
Nakamura, Tadashi: *See*—
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Nakano, Keita; and Tsukamoto, Takuzo, to Fuji Xerox Co., Ltd. Electrostatic duplicating method and apparatus utilizing wet-developing. 3,991,711, Cl. 118-637.000.
Nakatsuka, Iwao: *See*—
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.
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Nakazawa, Tamotu; Ina, Kenzoh; and Minagawa, Takashi, to Canon Kabushiki Kaisha. Information retrieving apparatus. 3,992,700, Cl. 340-172.500.
Naniwada, Satoru: *See*—
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Napier, Donald R.; and Starks, Charles M., to Continental Oil Company. Phase transfer catalysis of heterogeneous reactions by quaternary salts. 3,992,432, Cl. 260-465.100.

Napor, Carl A.; and Milana, Anthony A., to Kahle Engineering Co. Automatic frame brazing machine. 3,991,927, Cl. 228-41.000.
Nara, Toshihiko: *See—*
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Nard Institute, Ltd.: *See—*
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Nelson, Grant W.: *See—*
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Nelson, Harry N.: *See—*
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Nesemann, Georg: *See—*
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Networks Electronic Corporation: *See—*
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Neumann, Frank D., to Boeing Company, The. Turnout landing gear array carrier for high-wing aircraft. 3,991,957, Cl. 244-102.00R.
Neumer, John-Fred, to Du Pont de Nemours, E. I., and Company. 2,3-Disubstituted-1-indanones. 3,992,450, Cl. 260-570.00R.
Nevin, Robert S.: *See—*
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Newkirk, Marc S., to International Materials Corporation. Fuel reformation system. 3,992,165, Cl. 48-214.00R.
Nichols, Russell J.: *See—*
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Nickell, Louis G., to Hawaiian Sugar Planters' Association. Tetrahydrofuroic hydrazide for ripening sugarcane. 3,992,186, Cl. 71-88.000.
Nickell, Louis G., to Hawaiian Sugar Planters' Association. Aminopenicillanic acid or penicillamine as ripener for sugarcane. 3,992,187, Cl. 71-90.000.
Nickell, Louis G., to Hawaiian Sugar Planters' Association. Chemical ripening of sugarcane using alkylarsinic acid compounds. 3,992,190, Cl. 71-97.000.
Nickerson, William A.: *See—*
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Nicpon, John E., to Appleton Electric Company. Hinged cover for outdoor lamp case. 3,991,905, Cl. 220-343.000.
Niehenke, Edward C.; and Linsenbardt, Aldo E., to Westinghouse Electric Corporation. Broadband, upper sideband terminated, low-noise parametric amplifier. 3,992,675, Cl. 330-4.900.
Nieman, John R.; and McFarland, Lawrence W., to Caterpillar Tractor Co. Method and apparatus for the introduction of additives into a casting mold. 3,991,808, Cl. 164-4.000.
Nieman, John R., to Caterpillar Tractor Co. Method and apparatus for introducing additives into a casting mold. 3,991,810, Cl. 164-57.000.
Niemi, Paul A.: *See—*
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Niklas, Ludwig, to Krautkramer-Branson, Incorporated. High resolution pulse-echo ultrasonic method and apparatus. 3,991,607, Cl. 73-67.700.
Niklaus, Manser: *See—*
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Nilsson, Bengt, to Allmanna Svenska Elektriska Aktiebolaget. Collecting apparatus for gases. 3,992,155, Cl. 23-254.00E.
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Nishikawa, Kenji. Adhesive tape holder means. 3,991,923, Cl. 225-20.000.
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Noakes, Michael Lesney; Caesar, Wilfred George; and Lloyd, Henry, to United Kingdom Atomic Energy Authority. Fabricating bodies. 3,992,330, Cl. 252-466.00J.
Nobuta, Kouji, to Nihon Rokaki, Kabushiki Kaisha. Device for detecting the clogging of strainer filter. 3,992,296, Cl. 210-90.000.
Noguchi, Hiroshi: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.
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Northrup, Leonard L., Jr.; and O'Neill, Mark J. Roof-lens solar collector. 3,991,741, Cl. 126-271.000.
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Notaro, Pietro, to H.G.N. Motoren GmbH & Co. Method and apparatus for introducing a combustible mixture into the cylinders of an internal combustion engine. 3,991,729, Cl. 123-75.00B.
Nowak, Herbert: *See—*
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Noyes, Paul R., to Du Pont de Nemours, E. I., and Company. Coating compositions containing an aminoplast resin and an alkyl acid phosphate curing agent. 3,992,338, Cl. 260-21.000.
Numata, Saburo; Fujino, Shinichiro; and Komori, Masanoshin, to Fuji Photo Optical Co., Ltd. Logarithmic amplifier with temperature compensation means. 3,992,622, Cl. 250-214.00C.
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Oertel, Gunter: *See—*
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Oglander, Allen H.; and Shannon, Richard E. Label dispensing machine. 3,991,906, Cl. 221-73.000.
Ogren, John R.; Rutkowski, Eugene V.; and Appel, Marvin, to TRW Systems & Energy. Chemical laser pump. 3,992,685, Cl. 331-94.50G.
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Okagami, Akio; Furuta, Akio; and Nakamura, Toshikazu, to Japan Gasoline Co., Ltd.; and Nikki Chemical Co., Ltd. Low temperature steam reforming process for hydrocarbons. 3,992,166, Cl. 48-214.00A.
Okamoto, Isao: *See—*
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Turley, Richard J.; and Doerr, Richard L., 3,992,488.
Oliveira, Robert J., to Minnesota Mining and Manufacturing Company. Detecting system. 3,992,096, Cl. 356-36.000.
Olson, Jack E.; Frey, Lyle D.; and Nevin, Robert S., to Dieterich Standard Corporation. Electronic meter signalling device. 3,992,655, Cl. 317-123.000.
Olson, Larry Ray; and Massey, J. Max, Jr., to United States of America, Navy. Optical tracking analog flywheel. 3,992,708, Cl. 343-6.00R.
Olson, Paul E., to American Standard, Inc. Fluid circuit plate for a circuit module for fluid distribution. 3,991,786, Cl. 137-561.00R.
Olympus Optical Co., Ltd.: *See—*
Yamashita, Nobuo, 3,992,086.
OMNI Railway Equipment Limited: *See—*
Bruning, William E., 3,991,807.
Omni Research Incorporated: *See—*
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O'Neill, Mark J.: *See—*
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Onikov, Eduard Arshakovich: *See—*
Galperin, Alexandr Lvovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Zabotin, Alexandr Alexandrovich; and Sakharov, Boris Alexandrovich, 3,991,794.
Ooms, Bertus: *See—*
Nelson, James C.; and Ooms, Bertus, 3,991,562.
Oowada, Takeshi, to Aihara, Hisanao. Apparatus for measuring airtightness of sealed body. 3,991,622, Cl. 73-49.300.
Opfermann, Johannes: *See—*
Horhold, Hans-Heinrich; Gottschaldt, Joachim; Bergmann, Regina; Opfermann, Johannes; Seliger, Walter; Augst, Siegfried; and Arnstadt, Hartmut, 3,992,203.
Oppelt, John Christian; and Susi, Peter Vincent, to American Cyanamid Company. Ethanol- and substituted ethanolamides of hindered 3,5-dialkyl-4-hydroxybenzoic acids. 3,992,434, Cl. 260-473.00S.
Optical Coating Laboratory, Inc.: *See—*
Thelen, Alfred J.; Aguilera, John A.; Grant, James N.; and Michel, George Eugene, 3,991,707.
Optical Sciences Group, Inc.: *See—*
Flom, Merton C.; and Adams, Anthony J., 3,992,087.
Orban, Jean: *See—*
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Uyetake, Tadao; Higa, Teikichi; Orillo, Stephen, Jr; and Nakano, Gregory S., 3,992,123.
O'Rourke, Jessie, to Raymond Lee Organization, Inc., The, a part interest. Portable vibrator. 3,991,751, Cl. 128-36.000.
Orth, Edward G., to Westinghouse Air Brake Company. Floor structure for earthmoving scraper. 3,991,493, Cl. 37-7.000.
Osakabe, Yoshio, to Sony Corporation. Reverberation sound producing apparatus. 3,992,582, Cl. 179-1.00J.
Osrodek Badawczo-Rozwojovy Obrobky Plastycznej Metali "Plasomet": *See—*
Antosiak, Jerzy, 3,991,681.
Osterman, Milton: *See—*
Wolk, Charles J.; and Osterman, Milton, 3,991,857.
Oswald, Fred. Apparatus for sharpening blades mounted on drums. 3,991,525, Cl. 51-249.000.
Oswin, Harry G.; and Blurton, Keith F., to Energetics Science, Inc. Electrochemical gas detection method. 3,992,267, Cl. 204-1.00T.
Otaki, Tadaaki; Wada, Naoto; and Hatano, Masakatu, to Mitsubishi Kasei Kogyo Kabushiki Kaisha. Method of preparing maleic anhydride and catalysts utilized therefor. 3,992,419, Cl. 260-346.80A.
Otis Engineering Corporation: *See—*
Gano, John C., 3,991,784.
Otsuka, Kazutoshi: *See—*
Washizawa, Yoshikazu; Kume, Kiyoshi; Ohba, Yasuhiro; and Otsuka, Kazutoshi, 3,992,029.
Otuki, Kazumaru. Variable calendar. 3,991,499, Cl. 40-109.000.
Owatonna Tool Company: *See—*
Masterman, James I.; Solie, James C.; Boers, Jan H.; and McClocklin, Samuel B., 3,992,131.
Owens, Ben Howard; LeFevre, Clyde Eugene; and Hagan, James Patrick, to Addressograph Multigraph Corporation. Information storage means. 3,991,497, Cl. 40-78.000.
Owens-Corning Fiberglas Corporation: *See—*
Finn, Lawrence R.; and Yawberg, Richard C., 3,991,538.
Marzocchi, Alfred; and Leary, David E., 3,992,160.
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Oxyer, Ronald A. Form positioning apparatus. 3,991,969, Cl. 249-20.000.
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Suzuki, Hideo; Yoshida, Harumi; Ozawa, Yoshiko; Kamibayashi, Akira; Sato, Munetaka; Mori, Atsushi; and Endo, Makoto, 3,992,260.
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Pako Corporation: *See—*
Bass, Larry I., 3,991,996.
Jensen, Gerald A., 3,992,097.
Palmquist, Harry Oskar, to Kockum Industri Aktiebolag. Log debarking machine. 3,991,800, Cl. 144-208.00E.
Panduit Corporation: *See—*
Bailey, Michael S., 3,991,444.
Papajewski, Reinhold; and Walter, Heinz Emil, to Singer Company, The. Bobbin thread depletion detector for sewing machine. 3,991,692, Cl. 112-218.00R.
Papantoniou, Christos: *See—*
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Parke, Davis & Company: *See—*
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Parkinson, Alan R., to Goodyear Tire & Rubber Company, The. Chemical process for the preparation of thiuram monosulfides. 3,992,448, Cl. 260-567.000.
Patrichi, Mihai D., to Networks Electronic Corporation. Pyrotechnic wire cutter. 3,991,649, Cl. 89-1.00B.
Patrick, Richard M.; Friedman, Herbert W.; and McCloskey, John W., to Jersey Nuclear-Avco Isotopes, Inc. Flashlamp pumped laser device employing fluid material for producing laser beam. 3,992,684, Cl. 331-94.50L.
Paulson, Gary R.; and Tenbrink, Ralph L., to Hewlett-Packard Company. Attaching print disc to drive in impact printers. 3,991,873, Cl. 197-53.000.
Paz, Carlos Fernandez-Sanguino. Radiation concentrator device for medical-aesthetical use. 3,991,769, Cl. 128-372.000.
Peak, Vaughn E., to United States of America, Army. Canister cartridge and projectile assembly with releasable nose. 3,991,682, Cl. 102-38.000.
Pearl, David R., to Gerber Garment Technology, Inc. Marking apparatus utilizing a dye thread. 3,991,706, Cl. 118-7.000.
Pease, John W.: *See—*
Derderian, George; Rodemann, Alfred H.; Mohon, Windell N.; and Pease, John W., 3,991,486.
Pedain, Josef; Dislich, Marianne; Oertel, Gunter; and Muller, Hans-Jurgen, to Bayer Aktiengesellschaft. Organic polyisocyanate solutions adapted for use in laquer. 3,992,316, Cl. 252-182.000.
Peitl, Josef, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Long-range nozzle. 3,991,942, Cl. 239-566.000.
Pekrul, Ewald H., to WABCO Westinghouse GmbH. Brake control valve device for fluid pressure operable dual brake systems for motor vehicles. 3,992,065, Cl. 303-28.000.
Pelin, Charles. Hydro-electric power plant. 3,991,563, Cl. 60-325.000.
Pennell, Phillip E., to Gates Rubber Company, The. Locking cable for securing portable objects such as bicycles. 3,991,445, Cl. 24-73.00A.
Pennwalt Corporation: *See—*
MacLeay, Ronald Edward, 3,992,368.
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Penttila, Wilfred K., to Raymond Lee Organization, Inc., The, a part interest. Vehicle jack. 3,991,977, Cl. 254-71.000.
Perchais, Jean: *See—*
Bohner, Beat; Dawes, Dag; Meyer, Willy; Perchais, Jean; and Fischer, Hanspeter, 3,992,398.
Perona, Maurice: *See—*
Lleres, Jean; Martin, Jean-Paul; Perona, Maurice; and Venot, Robert, 3,992,256.

Perry, Walter Merton. Container opening segment with attachment. 3,991,901, Cl. 220-269.000.

Persson, Russell C. Dry cell battery contactor. 3,992,227, Cl. 429-121.000.

Petersdorf, Gerhard: *See—*
Knechtel, Wilhelm; Petersdorf, Gerhard; and Sandner, Winfried, 3,991,483.

Peterson, Marvin L.: *See—*
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Petkau, Abram; and Pleskach, Stanley Daniel, to Atomic Energy of Canada Limited. Labelled phospholipid material colloidially dispersed and sized to localize at preselected organs. 3,992,513, Cl. 424-1.000.

Petrak, Daniel Ralph; and Foltz, Thomas Franklin, to Dresser Industries, Inc. Refractory castable. 3,992,214, Cl. 106-65.000.

Petree, David W., to Burlington Industries, Inc. Composite yarn and method of making the same. 3,991,551, Cl. 57-152.000.

Petri, Nello J. Dampening apparatus for a lithograph offset printing plate. 3,991,674, Cl. 101-148.000.

Petrosky, Charles. Rat removing. 3,991,508, Cl. 43-66.000.

Petrow, Henry G.; and Allen, Robert J., to Prototech Company. Catalytic platinum metal particles on a substrate and method of preparing the catalyst. 3,992,331, Cl. 252-472.000.

Petrow, Henry G.; and Allen, Robert J., to Prototech Company. Finely particulated colloidal platinum compound and sol for producing the same, and method of preparation. 3,992,512, Cl. 423-512.00R.

Pettersen, Edward A.: *See—*
Kotuby, Paul M.; Pettersen, Edward A.; and Velicka, Alvydas, 3,991,914.

Pettersson, Sven Goran: *See—*
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Pfaff Industriemaschinen GmbH: *See—*
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Pfeifer, Friedrich, to SMG Suddeutsche Maschinenbau-Gesellschaft mbH. Apparatus for protecting tools of hydraulic presses. 3,991,639, Cl. 83-61.000.

Pfizer Inc.: *See—*
Barth, Wayne E.; and Kuhla, Donald E., 3,992,388.
Corey, Elias J.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,992,438.
Helland, Gerald F., 3,992,441.
Kuhla, Donald E., 3,992,394.
Lowke, George E.; and Horvath, Bela Z., 3,992,517.
Schaaf, Thomas K.; and Corey, Elias J., 3,992,439.

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Phillips Petroleum Company: *See—*
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Cleary, James W., 3,992,359.
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Phillips, Ronald A.: *See—*
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Pieper, Curtis A. Fishing lure. 3,991,504, Cl. 43-42.060.

Pieper, Gustav Adolf: *See—*
Klaren, Dick Gerrit, 3,991,816.

Pitney-Bowes, Inc.: *See—*
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Pitts, James J.: *See—*
Hooks, Haywood, Jr.; and Pitts, James J., 3,992,506.

Pla, Jean F.: *See—*
Plan, Robert A. M.; Liautaud, Jacques C.; Makula, Marie-France; Gattel, Paule A.; Pla, Jean F.; and Debrus, Andre J. M., 3,992,367.

Place, Harry, to International Telephone and Telegraph Corporation. Microfilm instruction system. 3,992,092, Cl. 355-41.000.

Plan, Robert A. M.; Liautaud, Jacques C.; Makula, Marie-France; Gattel, Paule A.; Pla, Jean F.; and Debrus, Andre J. M., to Institut Merieux. Process for the preparation of purified albumin by thermocoagulation and albumin obtained by said process. 3,992,367, Cl. 260-122.000.

Plank, Charles J.; Rosinski, Edward J.; and Schwartz, Albert B., to Mobil Oil Corporation. Hydrocarbon conversion. 3,992,466, Cl. 260-671.00C.

Platt Saco Lowell Corporation: *See—*
Savageau, Richard J., 3,991,443.

Platzer, George E., Jr. Collapsible support structure. 3,991,961, Cl. 248-99.000.

Pleskach, Stanley Daniel: *See—*
Petkau, Abram; and Pleskach, Stanley Daniel, 3,992,513.

Plonsker, Larry: *See—*
Malec, Robert E.; and Plonsker, Larry, 3,992,308.

Plummer, Charles R.: *See—*
McGuire, James T.; Plummer, Charles R.; and Rudowsky, Peter P., 3,991,608.

Plummer, Dexter Robert; Avison, Gerald; Stanwell-Smith, Colin Howard; and Ridler, Keith Douglas, to Strathearn Audio Limited. Method and apparatus for use in cleaning a gramophone disc. 3,992,018, Cl. 274-47.000.

Poli Industria Chimica S.p.A.: *See—*
Massaroli, Giangiacomo, 3,992,543.

Polistina, Rocco Albert: *See—*
Schmitt, Edward Emil; and Polistina, Rocco Albert, 3,991,766.

Politz, William E.; and Christiansen, Gerald E. Cartridge valve with multiple shut-off. 3,991,973, Cl. 251-210.000.

Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Hydroprocessing aromatics to make cycloparaffins. 3,992,464, Cl. 260-667.000.

Polster, Rudolf: *See—*
Pommer, Ernst Heinrich; Kradel, Juergen; and Polster, Rudolf, 3,992,548.

Polymark Limited: *See—*
Day, Ian; and Greenwood, John Carlton, 3,992,559.

Polysar Limited: *See—*
Vanderhoeden, Hans, 3,992,151.

Pommer, Ernst Heinrich; Kradel, Juergen; and Polster, Rudolf, to BASF Aktiengesellschaft. Fungicidal composition. 3,992,548, Cl. 424-274.000.

Pont-A-Mousson S.A.: *See—*
Langenfeld, Michel, 3,992,705.

Poppe, Wassily: *See—*
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Porter, Donald: *See—*
Gourdine, Meredith C.; Diamond, Stephen; and Porter, Donald, 3,991,710.

Porter, John P., to B. F. Goodrich Company, The. Elastomer processing apparatus. 3,991,984, Cl. 259-195.000.

Portnoy, Harold D. Shunt system resistant to overdrainage and siphoning and valve therefor. 3,991,768, Cl. 128-350.00V.

Powanda, Thomas M.; Rybny, Charles B.; and DeFazio, Charles A., to Celanese Corporation. Unsaturated polyesters for ultraviolet curable coatings. 3,992,276, Cl. 204-159.160.

Powell, Joseph W.: *See—*
Dulis, Edward J.; Fleck, James N.; and Powell, Joseph W., 3,992,202.

Powers Manufacturing Incorporated: *See—*
Hobler, Ross L.; and Bryant, Nelson H., 3,991,883.

Powers, Ronald J.; and Van Zandt, John M. Cosmetic applicator. 3,991,777, Cl. 132-88.700.

PPG Industries, Inc.: *See—*
Frank, Robert G., 3,992,181.
Frank, Robert G., 3,992,182.

Prahl, Jan, to Ipos Gesellschaft fur Integrierte Prothesenentwicklung und Orthopadietechnischen Service m.b.H. & Co. K.G. Compression sheath for below knee amputated limbs. 3,991,424, Cl. 3-1.000.

Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co.: *See—*
Friederichs, Paul; and Vitt, Theodor, 3,991,437.

Prasad, Raj Nandan; Stein, Herman Hal; and Tietje, Karin Rosemarie, to Abbott Laboratories. 2-Substituted adenosine-5'-carboxylates in the treatment of anginal pain. 3,992,531, Cl. 424-180.000.

Praszek, Jerome T., to B. F. Goodrich Company, The. Pneumatic tire with reinforced tread. 3,991,803, Cl. 152-361.00R.

Pre-Con, Inc.: *See—*
Buss, Jack, 3,992,614.

Preikschat, Fritz K. Electrical impedance measuring apparatus. 3,992,665, Cl. 324-57.00R.

Preston, James E.: *See—*
Segrest, Steven F.; and Preston, James E., 3,991,475.

Preston, James N. Gravity-measuring device for water and mineral detection. 3,991,625, Cl. 73-382.000.

Preston, Walter P., to Borg-Warner Corporation. Method and means of adjustment control for charge forming apparatus. 3,992,490, Cl. 261-41.00D.

Price, Virgil C.: *See—*
Burke, Norman R.; Kutnewsky, Drace W.; Price, Virgil C.; and Gerber, Dennis H., 3,991,900.

Priegnitz, James William, to UOP Inc. Process for the separation of 1,3-butadiene by selective adsorption on a zeolite adsorbent. 3,992,471, Cl. 260-681.50R.

Prikryl, Jaroslav: *See—*
Liebenow, Walter Otto; and Prikryl, Jaroslav, 3,992,379.

Pritchard, Dennis S., to Raymond Lee Organization, Inc., The. Bone piercing hunting bullet. 3,991,684, Cl. 102-92.200.

Pro Casa-Gesellschaft, REG. TRUST: *See—*
Bechtold, Leander; and Kartscher, Gunther, 3,992,658.

Procter & Gamble Company, The: *See—*
Cherney, Steven D., 3,992,314.
Drobish, James Lee; and Gougeon, Thomas William, 3,991,760.
Whyte, David D.; and Sampson, Ronald L., 3,992,493.

Produits Chimiques Pechiney-Saint Gobain: *See—*
Antonini, Albert; Kaziz, Claude; and Wetroff, Georges, 3,992,462.
Benaroya, Gerard; Graulier, Maxime; Long, Jacques; and Laine, Francois, 3,992,463.

Produits Chimiques Ugine Kuhlmann: *See—*
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Propper Manufacturing Company, Inc.: *See—*
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Prototech Company: *See—*
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Petrow, Henry G.; and Allen, Robert J., 3,992,512.

Pruess, David: *See—*
Kierstead, Richard Wightman; Le Mahieu, Ronald Andrew; and Pruess, David, 3,992,264.

Przybylowicz, Edwin P.; and Millikan, Allan G., to Eastman Kodak Company. Integral analytical element. 3,992,158, Cl. 23-253.0TP.

Psaar, Hubertus, to Bayer Aktiengesellschaft. Printing inks for transfer printing. 3,992,140, Cl. 8-2.50A.

Puckett, Dennis E.; Heatherington, Dale A.; and Jones, Eugene C., to National Data Corporation. Remote data line monitor. 3,992,587, Cl. 179-2.00C.

Purdue Research Foundation: *See—*
Incropera, Frank P.; and Link, William J., 3,991,764.

Putt, J. William. Energy conversion system. 3,992,132, Cl. 417-271.000.

Quaker Oats Company, The: *See—*
Kopp, Joseph N.; and Morris, Bruce V., 3,991,812.

Quelle, Fred W., Jr.: *See—*
White, Matthew B.; and Quelle, Fred W., Jr., 3,992,682.

Questor Corporation: *See—*
Koziatek, Jerome P.; and Wildgen, Leo F., 3,992,056.

Rabl, Ari, to United States of America, Energy Research and Development Administration. Sea shell solar collector. 3,991,740, Cl. 126-270.000.

Racal Instruments Ltd.: *See—*
Gittins, Derek R.; and Gregory, Michael D., 3,992,670.

Radford, F. Richard. Aspirating device for patient ventilation apparatus. 3,991,762, Cl. 128-276.000.

Raether, Wolfgang: *See—*
Winkelmann, Erhardt; and Raether, Wolfgang, 3,992,397.

Raffensperger, Maurice J.: *See—*
Bittel, Raymond H.; Helm, Harry A.; and Raffensperger, Maurice J., 3,992,580.

Rahaim, Thomas J.: *See—*
Booher, Claude R., Jr.; and Rahaim, Thomas J., 3,992,129.

Rakar, Geza; Toth, Zoltan; and Zsoka, Istvan, to Koolaj-Es Foldgazbanyaszati Ipari Kutato Laboratorium. Apparatus for carrying out underground measurements during drilling of underground strata. 3,991,610, Cl. 73-151.000.

Ramey, Chester E.; and Luzzi, John J., to Ciba-Geigy Corporation. Alkyl alkanoate derivatives of substituted piperazines and polymer compositions stabilized thereby. 3,992,351, Cl. 260-45.80N.

Ramey, Harry Borders. Combination heat pump and low temperature solar heat absorber. 3,991,938, Cl. 237-1.00A.

Rand, Ralph: *See—*
Rhyins, Richard W.; Rand, Ralph; Costello, Matthew J.; and Krallinger, Robert E., 3,992,623.

Randall, John M.; Baldwin, Leroy A.; Schneider, John M.; and Lee, Allen W., to Xerox Corporation. Photoelectrophoretic web machine servo drive system. 3,991,992, Cl. 270-52.000.

Randell, Donald Richard: *See—*
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Rank Organisation Limited, The: *See—*
Freeman, David; and Blandford, Brian, 3,992,078.

Rapp, Kenneth K. Pallet disassembling apparatus. 3,991,459, Cl. 29-252.000.

Rath, Eric; and Mauder, George C., Jr., to Frigitemp Corporation. Air conditioned transport of produce. 3,991,589, Cl. 62-62.000.

Rath, Lonnie Milo. Measurement tool. 3,991,474, Cl. 33-98.000.

Rausch, Richard E., to Universal Oil Products Company. Paraffin isomerizaton with a catalytic composite of platinum or palladium metal, rhodium metal, tin oxide, halogen and alumina carrier. 3,992,476, Cl. 260-683.680.

Rawcliffe, John, to University of Manchester Institute of Science & Technology, The. Weighing devices. 3,991,840, Cl. 177-210.000.

Raychem Corporation: *See—*
Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., 3,992,558.

Raymond Lee Organization, Inc., The: *See—*
Gumbs, Alexis A., deceased, 3,991,430.
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O'Rourke, Jessie, 3,991,751.
Penttila, Wilfred K., 3,991,977.
Pritchard, Dennis S., 3,991,684.
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Spellman, Robert C., 3,991,736.
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Raypak, Inc.: *See—*
Shippey, Frank R.; Vance, Timothy C.; and Martin, Fred E., 3,992,301.

Raytheon Company: *See—*
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Razdan, Raj Kumar: *See—*
Winn, Martin; Razdan, Raj Kumar; Dalzell, Haldean Cloyce; and Krei, Joyce Ruth, 3,992,550.

RCA Corporation: *See—*
Auerbach, Victor, 3,992,106.
Avery, Leslie Ronald, 3,992,648.
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Reardon, Robert C., Jr.: *See—*
Gutierrez, Eddie N.; and Reardon, Robert C., Jr., 3,992,414.

Reas, Lewis F.: *See—*
Curren, Roger L.; and Reas, Lewis F., 3,991,932.

Recker, Florian B. Shaft coupling. 3,992,119, Cl. 403-316.000.

Recker, Florian B. Shaft coupling. 3,992,120, Cl. 403-317.000.

Rees, Richard W. A.: *See—*
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Reflexite Corporation: *See—*
Rowland, William P., 3,992,080.

Regal Tool & Rubber Co. Inc.: *See—*
Waldrop, Tom C.; and Thomerson, Clarence T., 3,991,582.

Reisgies, Rolf W., to Germania Dairy Automation Incorporated. Pneumatic teat cup detaching apparatus. 3,991,716, Cl. 119-14.080.

Reiter, Ralph H.; and Rosen, George, to Sun Chemical Corporation. Photopolymerization initiators. 3,992,363, Cl. 526-292.000.

Reliance Steel Products Company: *See—*
Nagin, Harold, 3,992,163.

Renaud, Jean, to Societe Jaz S.A. Clock or watch movement. 3,991,556, Cl. 58-59.000.

Renbarger, Jerry J.: *See—*
Christian, John W.; and Renbarger, Jerry J., 3,992,147.

Renner, Hermann: *See—*
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Rentel, Alfred: *See—*
Uth, Gerhard; Zeimet, Heinrich; and Rentel, Alfred, 3,991,797.

Renth, Ernst-Otto: *See—*
Mentrup, Anton; Renth, Ernst-Otto; Schromm, Kurt; and Danneberg, Peter, 3,992,537.

Rentzsch, Max; and Hofmann, Gunther, to DIEHL. Safety device for projectiles. 3,991,683, Cl. 102-49.600.

Research Corporation: *See—*
Cates, Lindley A., 3,992,373.
Graham, Shirl O.; and Gurusiddaiah, Sarangamat, 3,992,528.
Mann, Elton W., 3,992,525.

Retford, David Thomas, to Brunswick Corporation. Molded solid golf ball comprising a silane for greater velocity. 3,992,014, Cl. 273-218.000.

Retzer, Erich, to Compur-Werk Gesellschaft mit beschrankter Haftung & Co. Method and equipment for speedy preparation of test liquids. 3,992,150, Cl. 23-230.00R.

Reuland, Joachim, to Hauni-Werke Korber & Co., KG. Method and apparatus for testing the wrappers of cigarettes and the like. 3,991,605, Cl. 73-38.000.

Rev-O-Pak, Inc.: *See—*
Whittell, Alfred, Jr.; and Block, Leo, 3,992,045.

Reynier, Jacques, to Societe des Accumulateurs Fixes et de Traction. Device and method for holding a storage battery. 3,991,844, Cl. 180-68.500.

Reynolds Metals Company: *See—*
Ashton, Richard F., 3,992,602.
Serio, Vincent J., Jr.; Fox, John H., Jr.; and Martin, James P., 3,991,878.

Reynolds, Richard W., to Welding Research, Inc. Narrow gap welding torch. 3,992,603, Cl. 219-136.000.

Rhone-Poulenc S.A.: *See—*
Ludec, Joel Le, 3,992,395.

Rhyins, Richard W.; Rand, Ralph; Costello, Matthew J.; and Krallinger, Robert E., to Graphic Sciences, Inc. Optical scanner. 3,992,623, Cl. 250-216.000.

Rhys, Hugh R. Oil shale sorting. 3,992,287, Cl. 209-2.000.

Rice, Donald D.; and Walton, Herbert H., to Fisher Controls Company, Inc. Quick-disconnect valve closure structure. 3,991,903, Cl. 220-327.000.

Rice, Leslie R., to Westinghouse Electric Corporation. Housing for a compression bonded encapsulation of a semiconductor device. 3,992,717, Cl. 357-72.000.

Richardson, Paul H.; and Theros, William S., to Sperry Rand Corporation. Zero insertion force card guide. 3,992,653, Cl. 317-100.000.

Richer, Werner: *See—*
Kracke, Jurgen; Miemietz, Hans-Peter; Derichs, Wilfried; Richer, Werner; and Stadelmann, Johann, 3,991,448.

Richey, John N. Billiard ball rack. 3,992,005, Cl. 273-22.000.

Richter, Helmut: *See—*
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Ricoh Co., Ltd.: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.
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Riedle, Rudolf: *See—*
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Rigas, Demetrios J.: *See—*
Fencl, Vernon R.; and Rigas, Demetrios J., 3,991,620.

Rinecker, Ulf F., to Envirotech Corporation. Waste grease-burning system. 3,991,689, Cl. 110-8.00P.

Rines, Robert H.: *See—*
Loud, Norman D.; Swanson, H. Damon; and Rines, Robert H., 3,992,523.

Ripley, Clarence A., Jr.: *See—*
Shannon, Joseph W.; Ripley, Clarence A., Jr.; and Dailey, John Henry, 3,991,911.

Risdon Manufacturing Company, The: *See—*
Kotuby, Paul M.; Pettersen, Edward A.; and Velicka, Alvydas, 3,991,914.

Ristau, Theodore F., to General Motors Corporation. Shaft retaining ring. 3,992,117, Cl. 403-14.000.

Ritter, Helmut; and Schnetzer, Max, to Heberlein Maschinenfabrik. Pneumatic auxiliary device. 3,991,545, Cl. 57-34.0HS.

Robert Bosch G.m.b.H.: *See—*
Leisner, Ernst, 3,992,138.

Roberts, John S., to Westinghouse Electric Corporation. Method of making a light activated semiconductor controlled rectifier. 3,991,460, Cl. 29-578.000.

Roberts, Michael G., to Owens-Corning Fiberglas Corporation. Unsaturated polyester with thermoplastic grafts using calcium hydroxide as gelling agent. 3,992,479, Cl. 260-862.000.

Robinson, Morris D. Fail safe apparatus for load lifts. 3,991,659, Cl. 92-9.000.

Robinson, Prentice I.; and Lavoie, Paul A., to Centronics Data Computer Corporation. Method and apparatus for printing segmented characters. 3,991,868, Cl. 197-1.00R.

Robinson & Sons Limited: *See—*
Glasby, Francis Goff, 3,991,663.

Rockwell International Corporation: *See—*
Luisi, James A.; Padgett, Clarence W.; and Street, Dana C., 3,992,703.

Rodemann, Alfred H.: *See—*
Derderian, George; Rodemann, Alfred H.; Mohon, Windell N.; and Pease, John W., 3,991,486.

Rodewald, Paul Gerhard, to Mobil Oil Corporation. Paraffin isomerization in the presence of isobutane or isopentane and a catalyst of aluminum chloride intercalated in graphite. 3,992,473, Cl. 260-683.700.

Rodgerson, Kenneth J.: *See—*
Flom, Leonard; and Rodgerson, Kenneth J., 3,991,426.

Rodzewich, Edward A.: *See—*
Anderson, James Douglas; Hayman, Edgar S., Jr.; and Rodzewich, Edward A., 3,992,313.

Roebke, Heide, to Schering Corporation. 2-Imidazolines and their use as hypoglycemic agents. 3,992,403, Cl. 260-309.600.

Rogers, Howard David: *See—*
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Rohm and Haas Company: *See—*
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Rohrbach, Hans, deceased (by Rohrbach, Herta, administratrix), to Ilok Powder Company, Inc. Process and equipment for the production of ultrafine powders particularly of coal powders with the help of a continuous cold warm influence on the ground material. 3,991,943, Cl. 241-1.000.

Rohrbach, Herta, administratrix: *See—*
Rohrbach, Hans, deceased, 3,991,943.

Roland Corporation: *See—*
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Rollins, Lester G., to Joy Manufacturing Company. Mining cutter bit assembly. 3,992,061, Cl. 299-86.000.

Rolls-Royce (1971) Limited: *See—*
Stewart, Peter Anthony Eabry, 3,992,627.

Rommerswinkel, Heinrich-Wilhelm: *See—*
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Rosen, George: *See—*
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Rosewicz, Horst: *See—*
Trieschmann, Hans-Georg; Rosewicz, Horst; Jansen, Gerhard; and Ballweber, Dieter, 3,992,277.

Rosinski, Edward J.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Schwartz, Albert B., 3,992,466.

Rossi, Joseph M. Hydraulic system for use in engines having reciprocating pistons and rotary piston rods. 3,991,654, Cl. 91-186.000.

Rough, Robert R., to Owens-Illinois, Inc. Apparatus for refining glass. 3,992,183, Cl. 65-178.000.

Roulier, Alfred; and Kamber, Walter, to Ciba-Geigy AG. Apparatus for detecting defect locations at the surface of a moving reflecting material. 3,992,111, Cl. 356-200.000.

Roussel-UCLAF: *See—*
Clemence, Francois; Deraedt, Roger; Allais, Andre; and Le Martret, Odile, 3,992,540.

Rowland, Wallace Loyd, Jr., to Brown & Williamson Tobacco Corporation. Method for extracting contents of a package. 3,991,892, Cl. 214-152.000.

Rowland, William P., to Reflexite Corporation. Retroreflective sheet material with controlled stretch and method of making same. 3,992,080, Cl. 350-103.000.

Rowley, James P.; Lewandowski, Edward F.; and Groh, Edward F., to United States of America, Energy Research and Development Administration. Rib forming tool for tubing. 3,991,599, Cl. 72-121.000.

Rudmann, Edgar, to Siemens Aktiengesellschaft. Circuit arrangement for automatic monitoring of protection time periods in street traffic signal systems. 3,992,671, Cl. 328-63.000.

Rudolph, Hans: *See—*
Hemmerich, Heinz-Peter; Rosenkranz, Hans Jurgen; and Rudolph, Hans, 3,992,487.

Rudowsky, Peter P.: *See—*
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Ruede, Ernst: *See—*
Stampfer, Michael; Graeber, Ewald; Oni, Helmut; and Ruede, Ernst, 3,991,618.

Rufer, Clemens; and Kessler, Hans-Joachim, to Schering Aktiengesellschaft. Amino-substituted nitroimidazolylmethyleneaminoimidazolidinones. 3,992,374, Cl. 260-240.00A.

Rupinski, Fredrick Alexander: *See—*
Kahan, William; Rupinski, Fredrick Alexander; Hunts, Barney Dean; Rogers, Howard David; Wagner, John Francis; and Landau, John Vernon, Jr., 3,991,592.

Ruppert, Robert W. Pile hammer cushion apparatus. 3,991,833, Cl. 173-20.000.

Russell, George K., to Sandoz, Inc. Patient ventilator trigger circuit. 3,991,790, Cl. 137-819.000.

Rutherford, Barry A. Lathing. 3,991,536, Cl. 52-661.000.

Rutkowski, Eugene V.: *See—*
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Rutz, David A.: *See—*
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Ryan, Patrick L.: *See—*
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Rybny, Charles B.: *See—*
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Ryder, Francis E.: *See—*
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Ryder International Corporation: *See—*
Thomas, Michael D.; and Ryder, Francis E., 3,991,908.

Rymer, Phillip R., to Square D Company. Segmented electric terminal strip. 3,992,074, Cl. 339-198.0GA.

Sabolcik, Rudolph E.: *See—*
Hanson, John P.; Sabolcik, Rudolph E.; and Svedberg, Robert C., 3,991,898.

Sack, Harry. Book holder. 3,991,967, Cl. 248-448.000.

Sadler, Leon Y., III; and Hatcher, William J., Jr., to United States of America, Interior. Catalysts and adsorbents having high surface area to weight. 3,992,327, Cl. 252-449.000.

Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
Depoix, Pierre, 3,992,228.

Sahasrabudhe, Arun P.; and McGinty, Michael V., to Westinghouse Electric Corporation. Fail-safe speed command signal decoder. 3,992,698, Cl. 340-167.00B.

St. Clair, David J.: *See—*
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St. Clair, Roger L.; and Thibault, Thomas D., to Eli Lilly and Company. Fluoralkyl quinoxadinediones. 3,992,378, Cl. 260-250.00Q.

St. Regis Paper Company: *See—*
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Saitoh, Shigeru; Watanabe, Tetsuya; Konno, Koji; and Nakamura, Tadashi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method of removing nitrogen oxides from a gas containing nitrogen oxides. 3,992,508, Cl. 423-235.000.

Sakai, Shoji: *See—*
Matsui, Isamu; Sakai, Shoji; Tsukada, Susumu; and Kawarabayashi, Susumu, 3,991,894.

Sakharov, Boris Alexandrovich: *See—*
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Sakurai, Tetsuo: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.

Salomon, Georges Pierre Joseph, to S.A. Etablissements Francois Salomon & Fils. Device for mounting a brake on a ski. 3,992,030, Cl. 280-605.000.

Same, Katsuyuki: *See—*
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Sami, Hiroshi; Taira, Kaoru; and Kumai, Teruo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Manifold reactor with auxiliary chamber for secondary afterburning during start-up. 3,991,566, Cl. 60-289.000.

Sampson, Ronald L.: *See—*
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Sandell, Torsten Wilhelm: *See—*
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Sander, Bruno; Bonitz, Eckhard; Berbner, Heinz; and Hoffmann, Manfred, to BASF Aktiengesellschaft. Production of non-foaming aqueous suspensions of polyethylene or polypropylene fibrids. 3,992,344, Cl. 260-29.6RW.

Sandner, Winfried: *See—*
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Sandoz, Inc.: *See—*
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Sankyo Company Limited: *See—*
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Aoki, Atsushi; Fukuda, Rikiya; Nakayabu, Toshio; Ishibashi, Keijiro; Takeichi, Chiyoko; and Ishida, Mitsuo, 3,992,551.
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Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, to Sumitomo Chemical Company, Limited. Method of manufacturing a semipermeable membrane from a water-soluble polymeric resin. 3,992,495, Cl. 264-22.000.

Sanyo Chemical Industries, Ltd.: *See—*
Genjida, Fumihide; Ii, Motohiko; and Nasuno, Toyoaki, 3,992,312.

Saotome, Hikogi. Defensive covering for the head. 3,991,422, Cl. 2-410.000.

Saraie, Takahiro: *See—*
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Sargent & Greenleaf, Inc.: *See—*
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Sasaki, Masao: *See—*
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Sasaki, Rentaro, to Oki Electric Industry Company, Ltd. High speed printer with multicolor ink ribbon. 3,991,676, Cl. 101-102.000.

Sasaki, Sadao: *See—*
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Sasaki, Yasushi: *See—*
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Sato, Hiroaki: *See—*
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Sato, Munetaka: *See—*
Suzuki, Hideo; Yoshida, Harumi; Ozawa, Yoshiko; Kamibayashi, Akira; Sato, Munetaka; Mori, Atsushi; and Endo, Makoto, 3,992,260.

Sato, Ryuich, to Nikkiso Co., Ltd. Bearing wear detecting device for canned motor driven pumps. 3,991,701, Cl. 116-114.00Q.

Sato, Tadashi; and Soma, Ikuo, to Canon Kabushiki Kaisha. Regenerating device for developing liquid. 3,991,709, Cl. 118-612.000.

Satzinger, Gerhard: *See—*
Stoss, Peter; Satzinger, Gerhard; and Herrmann, Manfred, 3,992,376.

Saurenman, Dean, to Del Tek, Inc. Medical equipment cleaning system. 3,991,779, Cl. 134-57.00R.

Sauvanet, Maurice, to Silec-Semi-Conducteurs. Synchronous switch. 3,992,638, Cl. 307-252.00B.

Savageau, Richard J., to Platt Saco Lowell Corporation. Sliver separating means. 3,991,443, Cl. 19-159.00A.

Savarino, Julius P. Protective baseball batting garment. 3,991,420, Cl. 2-2.000.

Savitt, Jacob; and Morgan, William Campbell, to United States of America, Navy. Booster apparatus for augmenting side initiation of explosive cords. 3,991,679, Cl. 102-27.00F.

Sawa, Yoshio: *See—*
Ishizawa, Kazutomo; and Sawa, Yoshio, 3,991,449.

Sawicki, John E.; and Murdock, James P., to Jos. Schlitz Brewing Company. Method of filtering liquids containing dissolved carbon dioxide. 3,992,293, Cl. 210-48.000.

Sawistowski, Henry: *See—*
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Scan-Data Corporation: *See—*
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Schaaf, Thomas K.; and Corey, Elias J., to Pfizer Inc. Synthesis of prostaglandins of the "one"-series. 3,992,439, Cl. 260-514.00D.

Schaaf, Thomas K.: *See—*
Corey, Elias J.; Bindra, Jasjit S.; and Schaaf, Thomas K., 3,992,438.

Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, to Merck Patent Gesellschaft mit beschrankter Haftung. 4(Quinolyl)phenoxy alkanoic acid derivatives. 3,992,386, Cl. 260-287.0CE.

Schall, Michael D., to Atlantic Richfield Company. Well consolidation method. 3,991,827, Cl. 166-253.000.

Schantz, Spencer C.; and Wilberscheid, Paul W., to Schantz, Spencer C. Buzz-proof solenoid. 3,992,687, Cl. 335-247.000.

Scharf, Daniel J.; and Chamberlin, Howard A., to Hooker Chemicals & Plastics Corporation. Process for sequestering metal ions. 3,992,294, Cl. 210-58.000.

Scheffler, Holger: *See—*
Cotte, Dietrich; Scheffler, Holger; and Kertzscher, Claus, 3,991,591.

Schellhase, Frank A.: *See—*
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Schenker, Barry A.: *See—*
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Scherf, Siegfried; and Greive, Aloys, to Hamel GmbH Zwirnmaschinen. Double-twist apparatus. 3,991,546, Cl. 57-80.000.

Schering Aktiengesellschaft: *See—*
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Schering Corporation: *See—*
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Schick, Hans: *See—*
Schneider, Paul; Schick, Hans; Mueller-Tamin, Heinz; and Hennenberger, Peter, 3,992,320.

Schiel, Christian, to J. M. Voith GmbH. Papermaking machine having a suction zone free of wire supports. 3,992,253, Cl. 162-290.000.

Schilling, Rolf E. Underwater power apparatus with furlable sails as working members. 3,992,125, Cl. 415-5.000.

Schimpf, James E.: *See—*
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Schinabeck, Rainer, to American Velodur Metal, Inc. Epoxy resin compositions. 3,992,358, Cl. 260-47.0EN.

Schindler, George R.: *See—*
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Schlessel, Walter, to Gemco-Ware, Inc. Self-contained detachable grinding device. 3,991,947, Cl. 241-169.100.

Schlueter, David Frederick, to Illinois Tool Works Inc. Package forming machine. 3,991,640, Cl. 83-341.000.

Schlumberger Technology Corporation: *See—*
Bouguyon, Gerard; and Chesnel, Pierre, 3,991,836.
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Schmelzer Corporation: *See—*
Benjamin, Benjamin C., 3,991,731.

Schmerling, Louis, to Universal Oil Products Company. Preparation of ketones. 3,992,451, Cl. 260-586.00C.

Schmidt, Edgar: *See—*
Muller, Horst; Bauer, Ignaz; Schmidt, Edgar; and Riedle, Rudolf, 3,992,428.

Schmidt, George; Halpern, Gerald M.; and Thomas, William R. L., to Jersey Nuclear-Avco Isotopes, Inc. Method and apparatus for extracting ions from a partially ionized plasma using a magnetic field gradient. 3,992,625, Cl. 250-284.000.

Schmidt, Jacob, Jr.: *See—*
Schmidt, Jacob, Sr.; and Schmidt, Jacob, Jr., 3,991,876.

Schmidt, Jacob, Sr.; and Schmidt, Jacob, Jr. Sanitary linkage connection means for food products processing conveyor. 3,991,876, Cl. 198-831.000.

Schmidtlein, Hubertus; and Berger, Joachim, to Vereinigte Flugtechnische Werke-Fokker Gesellschaft mit beschrankter Haftung. Reproduction of a field of view as scanned by a remote controlled aircraft. 3,992,707, Cl. 343-5.0CM.

Schmitt, Edward Emil; and Polistina, Rocco Albert, to American Cyanamid Company. Controlled release of medicaments using polymers from glycolic acid. 3,991,766, Cl. 128-335.500.

Schmitt, James L.; and Ohaver, David S., to Caterpillar Tractor Co. Modulation control valve for hydraulically operated winch. 3,991,787, Cl. 137-596.130.

Schmitz, Ruediger: *See—*
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Schneider, John M.: *See—*
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Schneider, Manfred: *See—*
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Schneider, Paul; Schick, Hans; Mueller-Tamm, Heinz; and Hennenberger, Peter, to BASF Aktiengesellschaft. Manufacture of a modified titanium component for catalysts of the Ziegler-Natta type. 3,992,320, Cl. 252-429.00B.

Schnetzer, Max: *See—*
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Schober, Johann; and Zimmer, Hermann, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft; and Binder & Co. Aktiengesellschaft. Vibratory mill for disintegrating material. 3,991,948, Cl. 241-175.000.

Schrader, Ernst-August. Device for the adjustment of the working width of road finishers. 3,992,124, Cl. 404-118.000.

Schrambock, Baldur: *See—*
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Schramm, Jurgen: *See—*
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Schroeder, Charles F., to Owens-Corning Fiberglas Corporation. Pneumatic tire carcass construction. 3,992,239, Cl. 156-133.000.

Schroff, Dennis E., to General Motors Corporation. Turbine engine starting fuel control. 3,991,558, Cl. 60-39.140.

Schromm, Kurt: *See—*
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Schueler, Marlin A., to American/Durein Company. Burster mechanism. 3,991,924, Cl. 225-100.000.

Schuermann, Kenneth W.; and Bazzell, David R., to Charles Machine Works, Inc., The. Conveyor attachment for spoils removal from a trench digging machine. 3,991,494, Cl. 37-90.000.

Schuh, Frank J., to Atlantic Richfield Company. Offshore well drilling, completion and production. 3,991,824, Cl. 166-.500.

Schwartz, Albert B.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Schwartz, Albert B., 3,992,466.

Schwartz, Hermann, to Peyer, Siegfried. Thread tension control apparatus for textile machinery. 3,991,954, Cl. 242-150.00M.

Schwartz, Hermann, to Peyer, Siegfried. Separable electrical connection arrangement. 3,992,077, Cl. 339-288.00R.

Schwartz, Michael M.: *See—*
Fielding, Ivor R.; Poppe, Wassily; Schwartz, Michael M.; and Whelan, James P., 3,992,224.

Schwartz, Willis T., Jr.: *See—*
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., 3,992,480.

Schwarz, Josef, to Bizerba-Werke Wilhelm Kraut K.G. Projection scale with price indicator. 3,991,839, Cl. 177-40.000.

Schwarzler, Hans Jurgen, to Vereinigte Flugtechnische Werke-Fokker Gesellschaft mit beschrankter Haftung. Attenuation of a closing flap for a secondary air intake opening in an aircraft engine. 3,991,782, Cl. 137-15.100.

SCM Corporation: *See—*
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Scott, R. Ray: *See—*
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Scott USA: *See—*
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Scourtes, Chris N. Swimming pool construction. 3,991,530, Cl. 52-146.000.

Scurlock, John T. Method of providing an underwater enclosure. 3,991,583, Cl. 61-69.00R.

Sealed Motor Construction Co. Ltd.: *See—*
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Sebenda, Jan: *See—*
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Seddick, Peter, to Siemens Aktiengesellschaft. Process and apparatus for locating short-circuits in multi-layer circuit boards. 3,992,663, Cl. 324-52.000.

Seeger, Ernst: *See—*
Trummlitz, Gunter; Teufel, Helmut; Engel, Wolfhard; Seeger, Ernst; Haarmann, Walter; and Engelhardt, Gunther, 3,992,535.

Seeman, Alex. Single spring wire playing ball mechanism. 3,992,007, Cl. 273-95.00A.

Segrest, Steven F.; and Preston, James E., to United States of America, Navy. Depth selecting spool device. 3,991,475, Cl. 33-126.500.

Seitz-Werke GmbH: *See—*
Uth, Gerhard; Zeimet, Heinrich; and Rentel, Alfred, 3,991,797.

Seko, Nachio: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.

Seliger, Walter: *See—*
Horhold, Hans-Heinrich; Gottschaldt, Joachim; Bergmann, Regina; Opfermann, Johannes; Seliger, Walter; Augst, Siegfried; and Arnstadt, Hartmut, 3,992,203.

Selsam, Roger L.: *See—*
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Serio, Vincent J., Jr.; Fox, John H., Jr.; and Martin, James P., to Reynolds Metals Company. Roll end support structure and dispensing carton. 3,991,878, Cl. 242-55.530.

SFM Corporation: *See—*
De Milt, Kenneth E.; and Collins, Stephen, 3,991,668.

SGB Group Limited: *See—*
Siegers, Egidius Henrikus Gerardus, 3,992,118.

Shachat, Norman: *See—*
Emmons, William D.; Moser, Vincent J.; Brodnyan, John G.; and Shachat, Norman, 3,992,333.

Shaffer, John W., to GTE Sylvania Incorporated. Photoflash lamp with polycarbonate coating. 3,992,136, Cl. 431-94.000.

Shahidi, Iraj K.; and Zeliznak, Kenneth J., to Celanese Corporation. Low gloss ultraviolet curable coatings utilizing α,α,α-trichlorotoluene as a photoinitiator. 3,992,275, Cl. 204-159.150.

Shair, Frederick H., to California Institute of Technology. Analysis system for an atmosphere tracer dispersion system. 3,991,626, Cl. 73-421.50R.

Shanahan, Robert W.: *See—*
Eloy, Fernand G. F.; and Shanahan, Robert W., 3,992,539.

Shannon, Joseph W.; Ripley, Clarence A., Jr.; and Dailey, John Henry, to American Beverage Control. Automatic drink dispensing apparatus having programming means. 3,991,911, Cl. 222-25.000.

Shannon, Richard E.: *See—*
Oglander, Allen H.; and Shannon, Richard E., 3,991,906.

Sharp, Fredrick A.: *See—*
Ferber, Benjamin I.; Sharp, Fredrick A.; and Freedman, Robert W., 3,992,153.

Sharps Associates: *See—*
Winn, Martin; Razdan, Raj Kumar; Dalzell, Haldean Cloyce; and Krei, Joyce Ruth, 3,992,550.

Shatterproof Glass Corporation: *See—*
Krebs, Jacob, 3,991,738.

Shaw, Donald E.: *See—*
Shaw, Jack B.; and Shaw, Donald E., 3,992,055.

Shaw, Fred B., to Continental Can Company, Inc. Sealing unit for autoclave sterilization of flexible packages. 3,991,543, Cl. 53-373.000.

Shaw, Jack B.; and Shaw, Donald E. Sportsman sling seat. 3,992,055, Cl. 297-217.000.

Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., to Sterling Drug Inc. Polyhydrophenanthrene derivatives. 3,992,437, Cl. 260-488.00B.

Shell Oil Company: *See—*
Benson, Herbert L., Jr., 3,992,326.
Harlan, James T., Jr.; and St. Clair, David J., 3,992,339.

Shemtov, Sami, to I-T-E Imperial Corporation Efcor Division. Fixture for holding a tubular workpiece during the machining thereof. 3,991,990, Cl. 269-25.000.

Shepherd Machinery Co.: *See—*
Shepherd, Willard W., 3,991,830.

Shepherd, Willard W., to Shepherd Machinery Co. Land clearing debris pulverizer. 3,991,830, Cl. 172-180.000.

Sheridan, James: *See—*
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Sherwood-Selpac Corporation: *See—*
Trinkwalder, Joseph C., Jr., 3,991,785.

Shibata, Tadashi: *See—*
Shigeta, Masayuki; Shibata, Tadashi; and Nara, Toshihiko, 3,991,856.

Shibuya, Hideo: *See—*
Watanabe, Masahiro; and Shibuya, Hideo, 3,992,709.

Shieh, Kenneth K., to Anheuser-Busch, Incorporated. Media containing molasses and corn steep liquor for producing glucose isomerase from Actinoplanes and method. 3,992,262, Cl. 195-66.00R.

Shigematsu, Tomohisa: *See—*
Suzuki, Yasoji; Manabe, Kenshi; Tanaka, Teruaki; and Shigematsu, Tomohisa, 3,992,635.

Shigeta, Masayuki; Shibata, Tadashi; and Nara, Toshihiko, to Hitachi, Ltd. Elevator cable oscillation-absorbing device. 3,991,856, Cl. 187-1.00R.

Shim, Kyung S., to Stauffer Chemical Company. Polyalkylene glycol vinyl phosphates. 3,992,489, Cl. 260-929.000.

Shimago, Kozo: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.

Shimomura, Shozo: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.

Shimomura, Takatoshi: *See—*
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Shimura, Kazuo: *See—*
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Shinetsu Chemical Company: *See—*
Itoh, Kunio; Yoshida, Takeo; and Fujiki, Hironao, 3,992,355.

Shinshu Seiki Kabushiki Kaisha: *See—*
Aizawa, Susumu; Futagawa, Yoshikiyo; and Kuriya, Katsumi, 3,991,671.

Shionoya, Toshio: *See—*
Amano, Yoshifumi; and Shionoya, Toshio, 3,992,577.

Shippey, Frank R.; Vance, Timothy C.; and Martin, Fred E., to Raypak, Inc. Automatic flushing system for membrane separation machines such as reverse osmosis machines. 3,992,301, Cl. 210-23.00H.

Shore, David Teignmouth; and Eddowes, Hugh, to A.P.V. Company Limited, The. Heat treatment of particulate solid material. 3,992,148, Cl. 21-94.000.

Showa Denko Kabushiki Kaisha: *See—*
Nakamura, Sigeru; Taguchi, Mitsuru; Naniwada, Satoru; and Ohguri, Naoki, 3,992,174.

Shum, Yick-Mow: *See—*
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Shurgan, Joel: *See—*
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Shuster, Nicholas: *See—*
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Sibley, Henry C.; Auer, John H., Jr.; and Smith, Willis R., to General Signal Corporation. Magnetically actuated registration circuitry for a vehicle control system. 3,991,958, Cl. 246-34.00R.

Sibrava, Joseph S., to Mueller Co. Rotary plug valve with notched sealing ring groove. 3,991,975, Cl. 251-317.000.

Siegers, Egidius Henrikus Gerardus, to SGB Group Limited. Scaffolding joint. 3,992,118, Cl. 403-171.000.

Siemens Aktiengesellschaft: *See—*
Gutbier, Heinrich, 3,992,223.
Kantz, Dieter, 3,992,704.
Katz, Helmut, 3,992,082.
Keck, Erich, 3,992,688.
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Silec-Semi-Conducteurs: *See—*
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Simane, Zdenek: *See—*
Schacht, Erich; Mehrhof, Werner; Nowak, Herbert; Simane, Zdenek; and Kayser, Detlev, 3,992,386.

Simeti, Samuel. Fishing spreader connector and combination thereof. 3,991,505, Cl. 43-42.740.

Simmons, George A., to Owens-Illinois, Inc. Glass ceramic and process therefor. 3,992,179, Cl. 65-30.00E.

Simmons, George A., to Owens-Illinois, Inc. Glass-ceramic and process therefor. 3,992,180, Cl. 65-33.000.

Simpson, Curtis W. Boat lift. 3,991,698, Cl. 114-66.50R.

Singer Company, The: *See—*
Canning, Tim W., 3,992,686.
Golenski, Stephen S., 3,991,485.
Kahan, William; Rupinski, Fredrick Alexander; Hunts, Barney Dean; Rogers, Howard David; Wagner, John Francis; and Landau, John Vernon, Jr., 3,991,592.
Papajewski, Reinhold; and Walter, Heinz Emil, 3,991,692.

Singer, Malcolm S., to Chevron Research Company. Herbicidal and/or fungicidal 5-polyhaloethylimino- and 5-polyhalovinylimino-2,4-imidazolidinediones. 3,992,402, Cl. 260-309.500.

Singh, Baldev: *See—*
Lesher, George Y.; and Singh, Baldev, 3,992,380.

Sirrenberg, Wilhelm; Hammann, Ingeborg; Stendel, Wilhelm; and Schramm, Jurgen, to Bayer Aktiengesellschaft. Benzoylureidodiphenyl ether insecticides. 3,992,553, Cl. 424-304.000.

Situmo Holding S.A.: *See—*
Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, 3,991,540.

Situno Holding S.A.: *See—*
Ballestrazzi, Aris; Tassi, Lamberto; and Tosarelli, Gianni, 3,991,909.

Skaletzky, Louis L.: *See—*
Coverdale, Charles E.; and Skaletzky, Louis L., 3,992,382.

Skinner, Warren. Implement for driving and removing fence posts. 3,991,976, Cl. 254-30.000.

Skoll, Merceline L., to Trans-Metals Corporation. Electroless plating composition. 3,992,211, Cl. 106-1.000.

Slates, Harry L.: *See—*
Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., 3,992,411.
Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., 3,992,412.

Sloan, Thomas W.: *See—*
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SMG Suddeutsche Maschinenbau-Gesellschaft mbH: *See—*
Pfeifer, Friedrich, 3,991,639.

Smith, Frank, to Imperial Chemical Industries Limited. Coating and bonding of metals. 3,991,929, Cl. 228-208.000.

Smith, Harvey J., Sr.; and Lipford, John T. Multipurpose knockdown handcart. 3,992,034, Cl. 280-654.000.

Smith, Horace L., Jr., to Smitherm Industries, Inc. Methods of and apparatus for expanding tobacco. 3,991,772, Cl. 131-138.000.

Smith, Howard H., to Raymond Lee Organization, Inc., The, a part interest. Dual purpose spoon and oyster knife. 3,991,466, Cl. 30-149.000.

Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., to Raychem Corporation. Process of coating particles of less than 20 microns with a polymer coating. 3,992,558, Cl. 427-213.000.

Smith, Trevor Stanley, to Lucas Industries Limited. Fuel control system for gas turbine engine. 3,991,569, Cl. 60-39.28R.

Smith, Willis R.: *See—*
Sibley, Henry C.; Auer, John H., Jr.; and Smith, Willis R., 3,991,958.

Smitherm Industries, Inc.: *See—*
Smith, Horace L., Jr., 3,991,772.

Snavely, Robert L., to A. O. Smith Corporation. Combination attachment for water heater electric heating element and thermostat. 3,992,608, Cl. 219-336.000.

Snyder, Ronald R.: *See—*
Su, Kenneth S. E.; Snyder, Ronald R.; and Scott, R. Ray, 3,992,215.

Sobecks, Ronald S.: *See—*
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 3,991,572.

Sobel, Jay E., to UOP Inc. Motor fuel production with fluid catalytic cracking of high-boiling alkylate. 3,992,474, Cl. 260-683.480.

Societe Anonyme dite: L'Oreal: *See—*
Jacquet, Bernard; Papantoniou, Christos; Dufaure, Pierre; and Mahieux, Claude, 3,992,356.

S.A. Etablissements Francois Salomon & Fils: *See—*
Salomon, Georges Pierre Joseph, 3,992,030.

Societe des Accumulateurs Fixes et de Traction: *See—*
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Societe Jaz S.A.: *See—*
Renaud, Jean, 3,991,556.

Soga, Setsuo: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.

Solie, James C.: *See—*
Masterman, James I.; Solie, James C.; Boers, Jan H.; and McClocklin, Samuel B., 3,992,131.

Solo, Alan J., to Knock-N-Lok International, Inc. Curtain rod support. 3,991,963, Cl. 248-262.000.

Soma, Ikuo: *See—*
Sato, Tadashi; and Soma, Ikuo, 3,991,709.

Sommer, Richard; and Haebler, Wolfgang, to Bayer Aktiengesellschaft. Exhaust process for the dyeing of synthetic fiber materials. 3,992,143, Cl. 8-41.00R.

Somogyi, Bela, to Hughes Aircraft Company. Watch construction. 3,991,554, Cl. 58-23.0BA.

Sony Corporation: *See—*
Amano, Yoshifumi; and Shionoya, Toshio, 3,992,577.
Isono, Katsuo, 3,992,679.
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Mori, Yoshihisa; Shimura, Kazuo; and Watanabe, Hiroyuki, 3,992,017.
Osakabe, Yoshio, 3,992,582.
Suzuki, Tadao, 3,992,678.
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Yamada, Mitsuyoshi; Hatada, Hideo; Izumisawa, Masato; Machida, Hiromasa; and Furuyama, Norihide, 3,992,647.

Soto, Ricardo Hurtado. Flexible package with counter-pressure dispenser. 3,991,912, Cl. 222-89.000.

South African Coal, Oil & Gas Corporation Limited: *See—*
Benade, Dirk Christoffel, 3,992,281.

Southampton Manufacturing Company, Incorporated: *See—*
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Southwire Company: *See—*
Bonnamour, Yves Bernard, 3,991,814.
Ward, George C.; and Gernetzke, William, deceased, 3,991,986.

Sparks, Allen K., to UOP Inc. Photodegradable polyolefin composition containing a mixture of an aryl ketone and an alkanolamine. 3,992,349, Cl. 260-32.60R.

Spatz Corporation: *See—*
Spatz, Walter B., 3,991,775.

Spatz, Walter B., to Spatz Corporation. Cosmetic applicator. 3,991,775, Cl. 132-79.00C.

Speaker Motion Systems, Inc.: *See—*
Wirth, Gary J., 3,991,866.

Specialty Connector Corporation: *See—*
Muslin, Bernard J., 3,992,044.

Speedfam Corporation: *See—*
McNamara, David M.; and Boettcher, Stephen A., 3,991,918.

Spellman, Robert C., to Raymond Lee Organization, Inc., The. Ratchet driving internal combustion engine. 3,991,736, Cl. 123-197.00R.

Sperr, Charles J., Jr., to Garrett Corporation, The. Composite electromagnetic coil. 3,992,690, Cl. 336-179.000.

Sperry Rand Corporation: *See—*
Davis, William W., 3,992,581.
Ihasz, Richard, 3,991,464.
Richardson, Paul H.; and Theros, William S., 3,992,653.

Spetzler, Edgar: *See—*
Klapdar, Wilhelm; Richter, Helmut; Rommerswinkel, Heinrich-Wilhelm; Spetzler, Edgar; and Wendorff, Jochen, 3,992,195.

Spoor, Herbert: *See—*
Hartmann, Heinrich; Kroker, Ruprecht; and Spoor, Herbert, 3,992,346.

Spranger, Douglas M.: *See—*
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Sprecher & Schuh AG: *See—*
Heutschi, Hans; and Thaler, Richard, 3,992,600.

Springer, Robert E.: *See—*
Banz, Derrald M.; and Springer, Robert E., 3,991,998.

Springer, William B.; Markley, Theodore J.; Burns, James F.; and Taylor, Donald E., to Allen-Bradley Company. Disconnect arm for electrical equipment. 3,992,654, Cl. 317-101.0DH.

Springfield Tool & Die, Inc.: *See—*
Knibbe, Jan C., 3,991,641.

Springmann, Hermann, to Chemische Werke Huls Aktiengesellschaft. Process for the carboxymethylation of alcohols or ether alcohols. 3,992,443, Cl. 260-535.00R.

Square D Company: *See—*
Rymer, Phillip R., 3,992,074.

Squitieri, Vincent; and Lynn, William Joseph, to Chomerics, Inc. Method of forming an interconnector. 3,991,463, Cl. 29-629.000.

Stadelmann, Johann: *See—*
Kracke, Jurgen; Miemietz, Hans-Peter; Derichs, Wilfried; Richer, Werner; and Stadelmann, Johann, 3,991,448.

Stadler Hurter Limited: *See—*
Hurter, Alfred Max, 3,992,248.

Stahli, Christian, to Noll, Hans, a part interest. Automatic pipetter. 3,991,616, Cl. 73-421.00R.

Stalker, Neil J.: *See—*
Brems, John H.; Stalker, Neil J.; and Ohrnberger, Peter H., 3,991,590.

Stampfer, Michael; Graeber, Ewald; Oni, Helmut; and Ruede, Ernst, to Maschinenfabrik Fahr Aktiengesellschaft. Sensor for automatic steering system for row-crop harvester. 3,991,618, Cl. 73-432.00R.

Standard Oil Company (Indiana): *See—*
Donohue, John A.; Fields, Ellis K.; and Hart, Harold, 3,992,435.
Fielding, Ivor R.; Poppe, Wassily; Schwartz, Michael M.; and Whelan, James P., 3,992,224.

Standiford, Fred W. Clamping saddles for thin flexible printing plates. 3,991,675, Cl. 101-415.100.

Stanly, Albert L.; and Wimmer, Gunther W., to Stanly, Albert L. Portable cardiac monitoring system and method. 3,991,747, Cl. 128-2.06R.

Stanray Corporation: *See—*
Lieser, Mathias J., 3,991,456.

Stanwell-Smith, Colin Howard: *See—*
Plummer, Dexter Robert; Avison, Gerald; Stanwell-Smith, Colin Howard; and Ridler, Keith Douglas, 3,992,018.

Stanzel, Victor, to Victor Stanzel Company. Model aircraft. 3,991,512, Cl. 46-76.00R.

Stark, Manfred: *See—*
Diez, Adolf; Stark, Manfred; and Anderko, Kurt, 3,991,811.

Starks, Charles M.: *See—*
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Stauffer Chemical Company: *See—*
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Kraft, Paul; and Altscher, Siegfried, 3,992,337.
Kraft, Paul; and Altscher, Siegfried, 3,992,481.
Kraft, Paul; and Altscher, Siegfried, 3,992,482.
Large, George B., 3,992,447.
Shim, Kyung S., 3,992,489.

Stauner, Thomas; and Kitzing, Rainer, to Ciba-Geigy AG, Process for crosslinking hydrophilic colloids. Process for crosslinking hydrophilic colloids. 3,992,366, Cl. 260-117.000.

Stearns, George W.: *See—*
Carton, Michael L.; Huetsch, Larry C.; and Stearns, George W., 3,992,064.

Steffen, Vincent B. Grain bin door. 3,991,913, Cl. 222-156.000.

Steigmann, Gottfried Albert: *See—*
Garlick, George Frederick John; Steigmann, Gottfried Albert; and Lamb, William Edward, 3,992,571.

Stein, Herman Hal: *See—*
Prasad, Raj Nandan; Stein, Herman Hal; and Tietje, Karin Rosemarie, 3,992,531.

Steinarson, Steinar: *See—*
Andersson, Conny; Folgero, Kare; Fredriksson, Bengt; Hedberg, Birger; Steinarson, Steinar; and Oberg, Karl-Erik, 3,991,813.

Stendel, Wilhelm: *See—*
Sirrenberg, Wilhelm; Hammann, Ingeborg; Stendel, Wilhelm; and Schramm, Jurgen, 3,992,553.

Stenne, Pierre, to Claudel S.A. Apparatus for the manufacture of cheeses. 3,991,667, Cl. 99-452.000.

Stephens, Edward Hargreaves, to Fearnhill Engineering Co. Ltd. Link driving belts. 3,991,632, Cl. 74-235.000.

Sterling Drug Inc.: *See—*
Lesher, George Y.; and Singh, Baldev, 3,992,380.
Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., 3,992,437.

Stewart, Peter Anthony Eabry, to Rolls-Royce (1971) Limited. Diagnostic apparatus. 3,992,627, Cl. 250-312.000.

Stewart Stamping Corporation: *See—*
Wolfthal, Maurice, 3,991,774.

Stift, Kurt; and Vacek, Helwig, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Rotary kiln and hearth furnace. 3,991,987, Cl. 266-163.000.

Stinnes, Wolf Walter. Silos. 3,991,718, Cl. 119-51.00R.

Stoakes, William L., to International Telephone and Telegraph Corporation. First and fourth harmonic system. 3,992,711, Cl. 343-17.500.

Stockhaus, Klaus: *See—*
Langbein, Adolf; Merz, Herbert; Walther, Gerhard; and Stockhaus, Klaus, 3,992,542.

Stoepel, Kurt: *See—*
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Stolfa, Frank; and Winfield, Michael D., to UOP Inc. Black oil conversion process startup and shutdown methods. 3,992,284, Cl. 208-108.000.

Stone, Edward P. Mechanism for locating an object. 3,991,478, Cl. 33-174.0TA.

Stonite Coil Corporation: *See—*
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Stoss, Peter; Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. Phenothiazine sulphoximides. 3,992,376, Cl. 260-243.00A.

Strathearn Audio Limited: *See—*
Plummer, Dexter Robert; Avison, Gerald; Stanwell-Smith, Colin Howard; and Ridler, Keith Douglas, 3,992,018.

Stratten, Charles L., to United States of America, Army. Personal blast protection armor. 3,991,421, Cl. 2-2.000.

Street, Dana C.: *See—*
Luisi, James A.; Padgett, Clarence W.; and Street, Dana C., 3,992,703.

Streisel, John A., to A. O. Smith Corporation. Gas burner. 3,992,137, Cl. 431-278.000.

Stridde, George E., to NL Industries, Inc. Process for alkylating aromatic hydrocarbons and catalyst therefor. 3,992,467, Cl. 260-671.00C.

Stromberg-Carlson Corporation: *See—*
Altenburger, Otto, 3,992,592.

Stromberg, Nils-Erik, to Sunds Aktiebolag. Apparatus for baling fibrous material. 3,991,670, Cl. 100-295.000.

Strong, Robert L.: *See—*
MacSpadden, Floyd E.; Schellhase, Frank A.; Strong, Robert L.; and Tieden, Jansey D., 3,991,653.

Studebaker, Gary Weldon. Simplified adjustable chair for children with cerebral palsy. 3,992,057, Cl. 297-384.000.

Studinka, Josef; and Gabler, Rudolf, to Inventa AG fur Forschung und Patentverwertung. Process for producing wet spun or shaped structures. 3,992,504, Cl. 264-184.000.

Sturm, Elmar; and Cellarius, Hans Jorg, deceased (by Cellarius-Haigermoser, Herta, legal representative), to Ciba-Geigy Corporation. Octahydropyrindine phosphorylacylamines. 3,992,387, Cl. 260-293.540.

Stute, Manfred, to Daimler-Benz Aktiengesellschaft. Exhaust gas catalyst mounting. 3,992,157, Cl. 23-288.0FC.

Su, Chauchang, to Burroughs Corporation. Electrostatic document handling apparatus. 3,991,995, Cl. 271-64.000.

Su, Kenneth S. E.; Snyder, Ronald R.; and Scott, R. Ray, to Eli Lilly and Company. Pharmaceutical suspension for opaqing empty gelatin capsules. 3,992,215, Cl. 106-287.0SB.

Sudoldenberger Tierfrischmehl-Anlagen GmbH & Co., KG: *See—*
Menge, Wilhelm, 3,991,480.

Suetsugu, Kensuke; Maruyama, Eiji; and Same, Katsuyuki, to Mitsubishi Chemical Industries Ltd. Black coloring agent. 3,992,218, Cl. 106-307.000.

Sugano, Thomas T.; Schenker, Barry A.; Walburg, Joseph A.; and Shuster, Nicholas, to Diamond Shamrock Corporation. Production of pinacols in a membrane cell. 3,992,269, Cl. 204-77.000.

Sugimoto, Tadahiro, to Daito Seiki Company, Ltd. Method for controlling the cutting feed speed of a saw frame of band-sawing machine or similar machine. 3,991,644, Cl. 83-800.000.

Sugiura, Yoshinori, to Canon Kabushiki Kaisha. Floating device for information disc apparatus. 3,992,576, Cl. 178-6.6DD.

Sukatsch, Dieter: *See—*
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Sullivan, Miles Vincent: *See—*
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Sumitomo Chemical Company, Limited: *See—*
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Sano, Takezo; Shimomura, Takatoshi; and Sasaki, Masao, 3,992,495.
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.

Sun Chemical Corporation: *See—*
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Sun Studs, Inc.: *See—*
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Sunds Aktiebolag: *See—*
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Susi, Peter Vincent: *See—*
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Urquhart, John, to Alza Corporation. Method and therapeutic system for treating aqueous deficient dry eye. 3,991,759, Cl. 128-260.000.

Urry, Grant Wayne, to Du Pont de Nemours, E. I., and Company. Synthesis of ethylenically unsaturated compounds from aldehydes or ketones. 3,992,472, Cl. 260-682.000.

Ushio, Masatoshi; Ikeuchi, Hisakazu; and Nakajima, Yukinobu, to Glory Kogyo Kabushiki Kaisha. Coin-processing device for sorting and processing various sized coins having a diameter-presetting member and at thickness-presetting member. 3,991,778, Cl. 133-8.00R.

Uth, Gerhard; Zeimet, Heinrich; and Rentel, Alfred, to Seitz-Werke GmbH. Rinsing device for circulating one-chamber vessel filling machines. 3,991,797, Cl. 141-91.000.

Utne, Torleif; Jobson, Ronald B.; and Lovell, Alfred V., to Merck & Co., Inc. Preparation of biphenyl compounds. 3,992,459, Cl. 260-649.00F.

Uyetake, Tadao; Higa, Teikichi; Orillo, Stephen, Jr; and Nakano, Gregory S., to United States of America, Navy. Pipe end machining apparatus. 3,992,123, Cl. 408-104.000.

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Vaessen, Franz, to Hochtief AG fur Hoch- und Tiefbauten. Cylindrical pressure chamber for nuclear reactor or the like. 3,991,899, Cl. 220-15.000.

Valentine, Charles G., to Xerox Corporation. Educational device for learning principles of standard transmission. 3,991,488, Cl. 35-13.000.

Valentine, Charles Glenn, to Xerox Corporation. Educational device for learning the fundamentals of an automotive carburetor system. 3,991,489, Cl. 35-13.000.

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van Erp, Jan B.; and Kimont, Edward L., to United States of America, Energy Research and Development Administration. Neutron-absorber release device. 3,992,257, Cl. 176-36.00C.

van Leer, Oscar Jacques, to Koninklijke Emballage Industrie Van Leer B.V. Hypodermic syringe. 3,991,757, Cl. 128-216.000.

Van Thillo, Hugo Johannes; Lammers, Rene Odon; Debus, Henri Robert; Cahen, Raymond Marc; and Andre, Jacques Maurice Jules Ghislain, to Labofina S.A. Alumina based catalysts and process for preparing such catalysts. 3,992,321, Cl. 252-429.00R.

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Vartanian, Haig. Metal powder production. 3,992,192, Cl. 75-.50B.

Vary, Eva M., to Du Pont de Nemours, E. I., and Company. Arloxysulfone copolymer solution having perfluoro-carbon polymer particles dispersed therein. 3,992,347, Cl. 260-30.200.

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Visceglia, Marco P.; and Wisdom, Trevor. Aerosol container having sealed propellant means. 3,992,003, Cl. 272-94.000.

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Walsh, William J.; McPheeters, Charles C.; Yao, Neng-ping; and Koura, Kobuyuki, to United States of America, Energy Research and Development Administration. Metallic sulfide additives for positive electrode material within a secondary electrochemical cell. 3,992,222, Cl. 429-221.000.
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Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., to Merck & Co., Inc. 2α-(2-Carboxy-2-oxoethyl)-3β-hydroxy-5-oxo-1β-cyclopentaneheptanoic acid and process. 3,992,412, Cl. 260-340.900.
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Wolk, Charles J.; and Osterman, Milton, to Wolk, Charles J. Elevatable platform for load transfer. 3,991,857, Cl. 187-18.000.
Wonn, James W.; and Bannister, Ronald L., to Westinghouse Electric Corporation. Moisture indicating apparatus. 3,991,603, Cl. 73-29.000.
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Workman, John. Tripodal vehicle. 3,992,024, Cl. 280-87.02W.
Wray, Stanley William, to Hamworthy Engineering Limited. Sewage treatment devices particularly for marine applications. 3,992,299, Cl. 210-152.000.
Wu, Sin An. Balustrade with adjustable supporting balusters. 3,991,981, Cl. 256-65.000.
Xerox Corporation: *See—*
Brooke, Edric Raymond, 3,991,999.
Fisher, Donald J., 3,992,091.
Kidd, Wayne L.; and Corona, Stephen C., 3,992,108.
Martin, Harvey G., 3,992,000.
Randall, John M.; Baldwin, Leroy A.; Schneider, John M.; and Lee, Allen W., 3,991,992.
Valentine, Charles G., 3,991,488.
Valentine, Charles Glenn, 3,991,489.
Waehner, Kenneth A.; and Giammarise, Anthony T., 3,992,511.
Whited, Charles A., 3,991,713.
Yakubov, Danir: *See—*
Miroshnichenko, Georgy Ivanovich; Korabelnikov, Rostislav Vasilievich; Yakubov, Danir; and Tjutin, Pavel Nikolaevich, 3,991,442.
Yamada, Hiroshi: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.
Yamada, Hirotada: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 3,992,371.
Yamada, Mitsuyoshi; Hatada, Hideo; Izumisawa, Masato; Machida, Hiromasa; and Furuyama, Norihide, to Sony Corporation. System for beam landing correction in color cathode ray tube in the earth's magnetic field. 3,992,647, Cl. 315-379.000.
Yamada, Yasuo: *See—*
Tashiro, Ichiro; Motobayashi, Kozo; Kamiya, Kazuo; Yoshizawa, Toshio; and Yamada, Yasuo, 3,991,950.
Yamaha, Hatsudoki Kabushiki Kaisha: *See—*
Aoki, Shigemitsu, 3,991,696.
Yamamoto, Yukio, to Yoshida Kogyo Kabushiki Kaisha. Balustrade with means for connection of balusters to a rail. 3,991,982, Cl. 256-65.000.
Yamasaki, Yasuhiro: *See—*
Nakagome, Yukio; Teramura, Hiroichi; Fukata, Yasuo; and Yamasaki, Yasuhiro, 3,992,572.
Yamashita, Nobuo, to Olympus Optical Co., Ltd. Compact retrofocus-type wide-angle photographic lens system. 3,992,086, Cl. 350-214.000.
Yamato, Hajime, to Matsushita Electric Industrial Co., Ltd. Coffeepot. 3,991,664, Cl. 99-310.000.
Yamazaki, Hideo: *See—*
Hirose, Hiroshi; Yamada, Hiroshi; Seko, Nachio; Kurokawa, Junji; Ikesue, Masumi; Shimomura, Shozo; Yamazaki, Hideo; Takeda, Hiroki; Sakurai, Tetsuo; Mano, Hiroshi; Fukuda, Minolu; Soga, Setsuo; and Noguchi, Yukio, 3,992,089.
Yamazaki, Yoshio, to Kabushiki Kaisha Suwa Seikosha. Liquid crystal display device with enhanged contrast. 3,992,081, Cl. 350-160.0LC.
Yamura Kabushikikaisha Shinko Seisakusho: *See—*
Fujio, Bunzo; Sasaki, Yasushi; and Takada, Hiromi, 3,991,872.
Yanagidaira, Hidetaka: *See—*
Michishita, Hisakichi; Yanagidaira, Hidetaka; and Furuya, Katsuhiko, 3,992,673.
Yao, Neng-ping: *See—*
Walsh, William J.; McPheeters, Charles C.; Yao, Neng-ping; and Koura, Kobuyuki, 3,992,222.
Yard, John S.: *See—*
Mannherz, Elmer D.; and Yard, John S., 3,991,612.

Yasunaga, Shigeki: *See—*
Kosugi, Takumi; Yasunaga, Shigeki; and Motoki, Takashi, 3,992,485.

Yawberg, Richard C.: *See—*
Finn, Lawrence R.; and Yawberg, Richard C., 3,991,538.

Yazejian, Diran, to Chrysler Corporation. Quick release seat retainer. 3,991,968, Cl. 248-501.000.

Yokota, Yasushi; and Tsuji, Hisao, to Bridgestone Tire Company Limited. Studded tire. 3,991,802, Cl. 152-210.000.

Yokoyama, Kiyofumi. Carpeting trimmer. 3,991,467, Cl. 30-293.000.

Yoo, Jin Sun; and Erickson, Henry, to Atlantic Richfield Company. Olefin polymerization catalyst. 3,992,323, Cl. 252-430.000.

Yoo, Jin Sun, to Atlantic Richfield Company. Product and process. 3,992,470, Cl. 260-680.00B.

Yoshida, Harumi: *See—*
Suzuki, Hideo; Yoshida, Harumi; Ozawa, Yoshiko; Kamibayashi, Akira; Sato, Munetaka; Mori, Atsushi; and Endo, Makoto, 3,992,260.

Yoshida Kogyo Kabushiki Kaisha: *See—*
Akashi, Shunji, 3,991,447.
Kobayashi, Susumu; and Nishimoto, Taibun, 3,991,642.
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Yoshida, Takashi: *See—*
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Yoshida, Takeo: *See—*
Itoh, Kunio; Yoshida, Takeo; and Fujiki, Hironao, 3,992,355.

Yoshikawa, Kensuke: *See—*
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, 3,991,559.

Yoshioka, Masanobu: *See—*
Nakagawa, Yasuhiko; Terasaka, Katsunori; Kimura, Susumu; and Yoshioka, Masanobu, 3,991,725.

Yoshizawa, Toshio: *See—*
Tashiro, Ichiro; Motobayashi, Kozo; Kamiya, Kazuo; Yoshizawa, Toshio; and Yamada, Yasuo, 3,991,950.

Yoslow, Mark L.: *See—*
Yoslow, Wilfred; Bicker, Alvin; and Yoslow, Mark L., 3,991,745.

Yoslow, Wilfred; Bicker, Alvin; and Yoslow, Mark L., to Wilmark Electronic Co., Inc. Curvature measurement device. 3,991,745, Cl. 128-2.00S.

Youtsey, Karl J.; Holt, William C., Jr.; and Carnahan, Robert D., to Universal Oil Products Company. Electrical resistor inks. 3,992,212, Cl. 106-1.000.

Yugen Kaisha Watanabe Kenkyusho: *See—*
Watanabe, Katsumi, 3,992,016.

Yumoto, Osamu: *See—*
Kaji, Tadao; Yumoto, Osamu; and Suzuki, Michio, 3,992,232.

Zabotin, Alexandr Alexandrovich: *See—*
Galperin, Alexandr Lvovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Zabotin, Alexandr Alexandrovich; and Sakharov, Boris Alexandrovich, 3,991,794.

Zaffrann, Albert A.; and Nelson, Grant W., to Allen-Bradley Company. Cover for disconnect switch. 3,992,601, Cl. 200-295.000.

Zahn, Irwin; and Rosenberg, Renate, to General Staple Company, Inc. Apparatus for forming a disconnect terminal. 3,991,452, Cl. 29-33.00M.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Ishizuka, Masaaki; Takamatsu, Akira; Oki, Toshikazu; and Tone, Hiroshi, 3,992,524.

Zaltsberg, Leib Aronovich: *See—*
Kerimov, Jusif Museibovich; and Zaltsberg, Leib Aronovich, 3,992,566.

Zambolin, Adriano; and Bisone, Dario, to Ing. C. Olivetti & C., S.p.A. Device for moving cards or separate forms in an accounting machine. 3,991,875, Cl. 197-127.00R.

Zanussi Grandi Impianti S.p.A.: *See—*
Del Fabbro, Claudio, 3,991,737.

Zawislak, Phyllis D., to Raymond Lee Organization, Inc., The. Collapsible luggage carrier. 3,992,033, Cl. 280-651.000.

Zehner, Lee R., to Atlantic Richfield Company. Synthesis of oxalate esters from carbon monoxide and carboxylic ortho esters. 3,992,436, Cl. 260-485.00R.

Zeimet, Heinrich: *See—*
Uth, Gerhard; Zeimet, Heinrich; and Rentel, Alfred, 3,991,797.

Zeitler, Gerhard; and Mueller-Tamm, Heinz, to BASF Aktiengesellschaft. Filaments and fibers and their manufacture. 3,992,341, Cl. 260-28.5AS.

Zelawski, Zbigniew S.: *See—*
Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., 3,992,411.
Wendler, Norman L.; Taub, David; Slates, Harry L.; and Zelawski, Zbigniew S., 3,992,412.

Zeliznak, Kenneth J.: *See—*
Shahidi, Iraj K.; and Zeliznak, Kenneth J., 3,992,275.

Zenith Radio Corporation: *See—*
Chodil, Gerald J.; DeJule, Michael C.; and Glaser, David, 3,992,644.

Zenon, Hemson Joseph. Liquid composition for fabric treatment. 3,992,332, Cl. 252-548.000.

Zent, Lawson J. Exercising apparatus. 3,991,749, Cl. 128-25.00R.

Ziegler, Charles W.: *See—*
Gabriele, Thomas L.; Willey, Francis J., III; and Ziegler, Charles W., 3,992,710.

Zilinskas, Gene: *See—*
Martin, Joseph E.; and Zilinskas, Gene, 3,992,693.

Zimmer, Hermann: *See—*
Schober, Johann; and Zimmer, Hermann, 3,991,948.

Ziner, Eugene P.: *See—*
Koepnick, Glenn; Balzen, Richard T.; and Etherton, Billy D., 3,992,662.

Zipin, Richard B.; Hart, John E.; and Grass, John W., to Bendix Corporation, The. Probe for a coordinate measuring machine. 3,991,477, Cl. 33-172.00E.

Zollner, Dieter: *See—*
Zollner nee Moller, Christine; Zollner, Dieter; and Koziol, Konrad, 3,992,280.

Zollner nee Moller, Christine; Zollner, Dieter; and Koziol, Konrad, to C. Conradty, Firma. Metal electrode with an active cover layer for electrochemical purposes. 3,992,280, Cl. 204-290.00F.

Zsoka, Istvan: *See—*
Rakar, Geza; Toth, Zoltan; and Zsoka, Istvan, 3,991,610.

Zuern, Ludwig: *See—*
Tatzel, Hermann; Koegel, Wolfram; Beck, Gilbert; Zuern, Ludwig; and Caesar, Arndt Christian, 3,992,501.

Zwisler, Oswald: *See—*
Konig, Wolfgang; Zwisler, Oswald; and Guthorlein, Gerhard, 3,992,529.

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976	B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976	B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976	B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976	B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976	B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976	B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976	B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976	B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976	B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976	B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976	B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976	B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976	B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976	B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976	B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976	B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976	B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976	B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976	B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976	B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976	B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976	B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976	B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976	B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976	B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976	B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976	B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976	B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976	B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976	B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976	B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976	B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976

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B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF NOVEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Andrews, Timothy Douglas, to Imperial Chemical Industries Limited. Metal deposition process. Re. 29,039, Cl. 204-30.000.

Balliett, Robert Wayne, to St. Joe Minerals Corporation. High strength zinc alloys. Re. 29,038, Cl. 75-178.0AM.

Cabot Corporation: *See*—
Herchenroeder, Robert B.; and Klein, Howard Joseph, Re. 29,035.

Caveney, Jack E.; Roberson, Raymond F.; and Rohaly, Joseph S., to Panduit Corporation. Wire cable harness assembly apparatus. Re. 29,037, Cl. 269-131.000.

Dow Chemical Company, The: *See*—
Marzolf, Richard T., Re. 29,040.

Fregeolle, Oscar, to Prenihan A.G. Seamless knit lower body garment and method of making same. Re. 29,034, Cl. 66-177.000.

Hager, Robert G. Luggage transport structure. Re. 29,036, Cl. 280-37.000.

Herchenroeder, Robert B.; and Klein, Howard Joseph, to Cabot Corporation. Methods of adding reactive metals to form a remelting electrode. Re. 29,035, Cl. 164-59.000.

Imperial Chemical Industries Limited: *See*—
Andrews, Timothy Douglas, Re. 29,039.

Klein, Howard Joseph: *See*—
Herchenroeder, Robert B.; and Klein, Howard Joseph, Re. 29,035.

Marzolf, Richard T., to Dow Chemical Company, The. Bubble-free, high barrier vinylidene chloride polymer films and process of preparation. Re. 29,040, Cl. 260-42.560.

Panduit Corporation: *See*—
Caveney, Jack E.; Roberson, Raymond F.; and Rohaly, Joseph S., Re. 29,037.

Prenihan A.G.: *See*—
Fregeolle, Oscar, Re. 29,034.

Roberson, Raymond F.: *See*—
Caveney, Jack E.; Roberson, Raymond F.; and Rohaly, Joseph S., Re. 29,037.

Rohaly, Joseph S.: *See*—
Caveney, Jack E.; Roberson, Raymond F.; and Rohaly, Joseph S., Re. 29,037.

St. Joe Minerals Corporation: *See*—
Balliett, Robert Wayne, Re. 29,038.

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Bringhurst, Royce S., and V. Voth, to Regents of the University of California. Strawberry plant. 3,979, 11–16–76, Cl. 49.

Bringhurst, Royce S., and V. Voth, to Regents of the University of California. Strawberry plant. 3,980, 11–16–76, Cl. 49.

Bringhurst, Royce S., and V. Voth, to Regents of the University of California. Strawberry plant. 3,981, 11–16–76, Cl. 48.

Driscoll Strawberry Associates, Inc.: *See*—
Johnson, Harold A., Jr. 3,982.

Hesse, Claron O., to Regents of the University of California. Peach tree. 3,973, 11–16–76, Cl. 43.

Hesse, Claron O., to Regents of the University of California. Peach tree. 3,976, 11–16–76, Cl. 43.

Hesse, Claron O., to Regents of the University of California. Peach tree. 3,977, 11–16–76, Cl. 43.

Hesse, Claron O., to Regents of the University of California. Peach tree. 3,978, 11–16–76, Cl. 43.

Hill, E. G., Co.: Inc.: *See*—
Jelly, Robert G. 3,975.

Jelly, Robert G., to E. G. Hill Co., Inc. Rose plant. 3,975, 11–16–76, Cl. 24.
Inc. Strawberry plant. 3,982, 11–16–76, Cl. 49.

Regents of the University of California: *See*—
Bringhurst, Royce S., and Voth. 3,979.
Bringhurst, Royce S., and Voth. 3,980.
Bringhurst, Royce S., and Voth. 3,981.
Hesse, Claron O. 3,973.
Hesse, Claron O. 3,976.
Hesse, Claron O. 3,977.
Hesse, Claron O. 3,978.

Johnson, Harold A., Jr., to Driscoll Strawberry Associates, Slusarenko, Jack D. Dwarf spur type red delicious apple tree. 3,974, 11–16–76, Cl. 35.

Voth, Victor: *See*—
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Bringhurst, Royce S., and Voth. 3,980.
Bringhurst, Royce S., and Voth. 3,981.

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Thorman, Tony A., and Ohlsson. 242,326.

Ackerei, Peter, to IISI Products AG. Phonograph record holder or the like. 242,319, 11–16–76, Cl. D6—185.

Aderman, Wayne L., and F. Wilkey, Jr., to International Business Machines Corp. Data processor. 242,356, 11–16–76, Cl. D26—5.

Adkinson, Joseph E. Armchair. 242,308, 11–16–76, Cl. D6—68.

Allen, Lenore T. Combined scarf and belt hanger. 242,320, 11–16–76, Cl. D6—251.

American Polarizers, Inc.: *See*—
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Arndt, James J.: *See*—
Arndt, Otto G., and J. J. 242,370.

Arndt, Otto G., and J. J. Arndt. Golf game target. 242,370, 11–16–76, Cl. D34—5.

Arnett, Alfred E. Rack for patient utensils or the like. 242,314, 11–16–76, Cl. D6—134.

Arnett, Alfred E. Rack for patient utensils or the like. 242,315, 11–16–76, Cl. D6—134.

Associated Mills, Inc.: *See*—
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Bauman, Jack. Leg elevating attachment for surgical operating table. 242,389, 11–16–76, Cl. D83—2.

Bauman, Jack. Disposable cover for laryngoscope. 242,393, 11–16–76, Cl. D83—12.

Bauman, Jack. Disposable cover for laryngoscope. 242,396, 11–16–76, Cl. D83—12.

Bauman, Jack. Disposable cover for laryngoscope. 242,397, 11–16–76, Cl. D83—12.

Bauman, Jack. Disposable cover for laryngoscope. 242,398, 11–16–76, Cl. D83—12.

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Bellin, Samuel J., to Crownmark Corp. Key ring. 242,395, 11–16–76, Cl. D87—8.

Bennett, Vincent R., to Hoffman Electronics Corp. Electric terminal crimping device. 242,382, 11–16–76, Cl. D15—123.

Berger, Carl-Arne, to Telefonaktiebolaget L M Ericson. Telephone key base. 242,358, 11–16–76, Cl. D26—14.

Bowman, Robert B. Combined wall mounted holder and flower pots therefor. 242,316, 11–16–76, Cl. D6—137.

Brabo Corp. S.A.N.V.: *See*—
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Brown, Jerry A. Towel rack. 242,311, 11–16–76, Cl. D6—99.

Bruce, John W., to Graphic Sciences, Inc. Facsimile transceiver. 242,359, 11–16–76, Cl. D26—14.

Bruni, James G., and S. G. Hauser, to Baxter Laboratories, Inc. Spectrophotofluorometer or the like. 242,365, 11–16–76, Cl. D32—2.

Burch, Jacob. Newspaper vending machine. 242,381, 11–16–76, Cl. D52—3.

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Campbell, Clifford E., D. D. Spangler, and R. J. Hunt, to Wausau Tile. Combined table and multiple seat unit. 242,305, 11–16–76, Cl. D6—45.

Campbell, Clifford E., D. D. Spangler, R. J. Hunt, and C. S. Winfit, to Wausau Tile. Combined table and multiple seat unit. 242,306, 11–16–76, Cl. D6—45.

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Castleberry, Jesse W. Therapeutic cushion. 242,388, 11–16–76, Cl. D83—1.
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Crimmins, James W., to Data Transmission Sciences, Inc. Speaker telephone. 242,361, 11–16–76, Cl. D26—14.
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De Priester, Donald J., D. C. Fuller, and J. E. Loomis, to Clark Equipment Co. Counterweight for a lift truck. 242,337. 11–16–76, Cl. D12—60.
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Fister, Judith W. Seat. 242,310, 11–16–76, Cl. D6—69.
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Uribe, Patricio: *See*—
Gomberoff, Ismael, and Uribe. 242,318.
Uyeda, Tim M., to Chicago Specialty Mfg. Co. Sink sprayer apparatus. 242,352, 11–16–76, Cl. D23—35.
Van Kersen, Philip L. Thermochromic thermometer. 242,329, 11–16–76, Cl. D10—57.
Vetter, Craig W., to Vetter Design Works, Inc. Motorcycle fairing. 242,339, 11–16–76, Cl. D12—182.
Vetter, Craig W., to Vetter Design Works, Inc. A pair of motorcycle fairing attachments. 242,340, 11–16–76, Cl. D12—182.
Vettter Design Works, Inc.: *See*—
Vetter, Craig W. 242,339.
Vetter, Craig W. 242,340.
Wausau Tile: *See*—
Campbell, Clifford, Spangler, Hunt, and Wipfli. 242,306.
Campbell, Clifford, Spangler, Hunt, and Wipfli. 242,306.
Wilkey, Frank, Jr.: *See*—
Aderman, Wayne L., and Wilkey. 242,356.
Wise, Wayne T. Security alarm device. 242,333, 11–16–76, Cl. D10—106.
Woods, David, to Quaker Chair Corp. Chair. 242,309, 11–16–76, Cl. D6—69.

CLASSIFICATION OF PATENTS

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CLASS 2
2 3,991,420
3,991,421
410 3,991,422
415 3,991,423

CLASS 3
1 3,991,424
1.91 3,991,425
13 3,991,426

CLASS 4
192 3,991,427

CLASS 5
63 3,991,428

CLASS 7
14.1R 3,991,429

CLASS 8
2.5A 3,992,140
4 3,992,141
16 3,992,142
41R 3,992,143
174 3,992,144
3,992,145

CLASS 12
115.2 3,991,430

CLASS 13
16 3,992,564

CLASS 15
147A 3,991,431
229BP 3,991,432
312R 3,991,433

CLASS 16
18A 3,991,434
94D 3,991,435
136 3,991,436
139 3,991,437

CLASS 17
1A 3,991,438
24 3,991,441
25 3,991,439
32 3,991,440

CLASS 19
53 3,991,442
159A 3,991,443

CLASS 21
58 3,992,146
3,992,147
94 3,992,148

CLASS 23
230C 3,992,152
230R 3,992,149
3,992,150
3,992,151
232R 3,992,153
253TP 3,992,154
3,992,158
254E 3,992,155
267MS 3,992,156
288FC 3,992,157
294 3,992,159

CLASS 24
16PB 3,991,444
73A 3,991,445
73P 3,991,446
205.14R 3,991,447

CLASS 28
37 3,991,448
72R 3,991,449

CLASS 29
17A 3,991,450
25.42 3,991,451
33M 3,991,452
37R 3,991,453
105R 3,991,454
156.6 3,991,455
157.1R 3,991,456
157.3R 3,991,457
182.5 3,992,160
3,992,161
191.6 3,992,163
193.5 3,992,162
196 3,992,164
234 3,991,458
252 3,991,459
578 3,991,460
588 3,991,461
605 3,991,462
623.5 3,992,224
629 3,991,463

CLASS 30
34.1 3,991,464
123.7 3,991,465
149 3,991,466
293 3,991,467
298 3,991,468
381 3,991,469
382 3,991,470

CLASS 32
1 3,991,471
9 3,991,472
22 3,991,473

CLASS 33
98 3,991,474
126.5 3,991,475
126.7R 3,991,476
172E 3,991,477
174TA 3,991,478

CLASS 34
1 3,991,479
10 3,991,480
28 3,991,481
48 3,991,482
95 3,991,483
162 3,991,484

CLASS 35
11 3,991,485
12N 3,991,486
12R 3,991,487
13 3,991,488
3,991,489
17 3,991,490

CLASS 36
11.5 3,991,491
109 3,991,492

CLASS 37
7 3,991,493
90 3,991,494

CLASS 40
28C 3,991,496
64R 3,991,495
78 3,991,497
86R 3,991,498
109 3,991,499

CLASS 42
1S 3,991,500
88 3,991,501

CLASS 43
5 3,991,502
15 3,991,503
42.06 3,991,504
42.74 3,991,505
44.88 3,991,506
54.5R 3,991,507
66 3,991,508
90 3,991,509

CLASS 46
1R 3,991,510
25 3,991,511
76R 3,991,512
180 3,991,513

CLASS 47
1.2 3,991,514
10 3,991,515
34R 3,991,516
57.6 3,991,517

CLASS 48
214A 3,992,166
214R 3,992,165

CLASS 49
75 3,991,518
159 3,991,519
276 3,991,520
417 3,991,521

CLASS 51
3 3,991,522
163.1 3,991,523
3,991,524
249 3,991,525
295 3,992,178
358 3,991,526
397 3,991,527

CLASS 52
79 3,991,528
100 3,991,529
146 3,991,530
173R 3,991,531
297 3,991,532
473 3,991,533
483 3,991,534
642 3,991,535
661 3,991,536
717 3,991,537

CLASS 53
21FW 3,991,538
26 3,991,539
59R 3,991,540
124A 3,991,541
198R 3,991,542
373 3,991,543

CLASS 55
67 3,992,174
3,992,175
71 3,992,176
288 3,992,177
427 3,992,172
501 3,992,173

CLASS 56
344 3,991,544

CLASS 57
34HS 3,991,545
80 3,991,546
119 3,991,547
140BY 3,991,548
140R 3,991,549
144 3,991,550
152 3,991,551

CLASS 58
4A 3,991,552
23BA 3,991,553
3,991,554
50R 3,991,555
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CLASS 60
39.06 3,991,557
39.14 3,991,558
39.28R 3,991,569
39.32 3,991,560
39.46R 3,991,559
3,991,561
39.65 3,991,562
255 3,991,565
289 3,991,566
303 3,991,567
325 3,991,563
3,991,564
327 3,991,568
413 3,991,570
422 3,991,571
531 3,991,572
550 3,991,573
645 3,991,574
669 3,991,575

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45C 3,991,577
45D 3,991,578
3,991,579
3,991,580
48 3,991,582
53.5 3,991,581
69R 3,991,583
111 3,991,584

CLASS 62
6 3,991,585
3,991,586
18 3,992,167
42 3,992,168
55 3,991,587
3,991,588
3,992,169
62 3,991,589
419 3,992,171
535 3,992,170

CLASS 64
29 3,991,590

CLASS 65
30E 3,992,179
33 3,992,180
104 3,992,181
163 3,992,182
178 3,992,183

CLASS 66
50B 3,991,591
75A 3,991,592
85A 3,991,593
177 Re.29,034

CLASS 70
30 3,991,594
120 3,991,595
303A 3,991,596

CLASS 71
62 3,992,184
76 3,992,185
88 3,992,186
90 3,992,187
92 3,992,188
96 3,992,189
97 3,992,190
121 3,992,191

CLASS 72
12 3,991,597
83 3,991,598
121 3,991,599
203 3,991,600
391 3,991,601
455 3,991,602

CLASS 73
29 3,991,603
37 3,991,604
38 3,991,605
49.3 3,991,622
67.5H 3,991,606
67.7 3,991,607
94 3,991,608
132 3,991,609
151 3,991,610
3,991,611
170A 3,991,623
189 3,991,624
194EM 3,991,612
194VS 3,991,613
215 3,991,614
352 3,991,615
382 3,991,625
421R 3,991,616
421.5R 3,991,626
423R 3,991,627
425.4P 3,991,617
432R 3,991,618
437 3,991,619
462 3,991,620
479 3,991,621
557 3,991,628

CLASS 74
15.4 3,991,629
117 3,991,630
231MB 3,991,631
235 3,991,632
493 3,991,633
745 3,991,634

CLASS 75
.5B 3,992,192
3,992,193
52 3,992,194
58 3,992,195
61 3,992,196
118R 3,992,197
124 3,992,198
178AM Re.29,038
200 3,992,199
207 3,992,201
211 3,992,200
222 3,992,202

CLASS 81
420 3,991,635

CLASS 83
12 3,991,636
50 3,991,638
61 3,991,639
341 3,991,640
440.1 3,991,641
490 3,991,637
539 3,991,642
564 3,991,643
800 3,991,644

CLASS 84
1.01 3,991,645
1.24 3,991,646
282 3,991,647
470 3,991,648

CLASS 89
1B 3,991,649
43R 3,991,650

CLASS 90
13C 3,991,652
13R 3,991,651
62R 3,991,653

CLASS 91
186 3,991,654
276 3,991,655
372 3,991,656
411A 3,991,657
505 3,991,658

CLASS 92
9 3,991,659
131 3,991,661

CLASS 93
12C 3,991,662
53SD 3,991,660
94R 3,991,663

CLASS 96
1.5 3,992,203
3,992,204
1.6 3,992,205
35 3,992,206
36 3,992,208
36.1 3,992,207
67 3,992,209
69 3,992,210

CLASS 99
310 3,991,664
441 3,991,665
446 3,991,666
452 3,991,667

CLASS 100
98R 3,991,668
162B 3,991,669
257 3,991,681
295 3,991,670

CLASS 101
93.04 3,991,671
99 3,991,672
102 3,991,676
127.1 3,991,677
148 3,991,674
395 3,991,673
415.1 3,991,675

CLASS 102
19.2 3,991,678
27F 3,991,679
28R 3,991,680
38 3,991,682
49.6 3,991,683
92.2 3,991,684

CLASS 104
165 3,991,685

CLASS 106
1 3,992,211
3,992,212
57 3,992,213
65 3,992,214
287SB 3,992,215
288B 3,992,216
291 3,992,219
306 3,992,217
3,992,220
307 3,992,218

CLASS 108
28 3,991,686
132 3,991,687

CLASS 109
32 3,991,688

CLASS 110
8P 3,991,689
119 3,991,690

CLASS 112
86 3,991,691
218R 3,991,692
219A 3,991,693

CLASS 114
39 3,991,694
45 3,991,695
56 3,991,696
57 3,991,697
66.5R 3,991,698
210 3,991,699

CLASS 115
18B 3,991,700

CLASS 116
114Q 3,991,701
115 3,991,702
147 3,991,703

CLASS 118
2 3,991,704
7 3,991,705
3,991,706
9 3,991,707
44 3,991,708
612 3,991,709
634 3,991,710
637 3,991,711
3,991,712
3,991,713

CLASS 119
1 3,991,714
5 3,991,715
14.08 3,991,716
19 3,991,717
51R 3,991,718
61 3,991,719

CLASS 122
32 3,991,720

CLASS 123
1R 3,991,721
8.09 3,991,723
8.13 3,991,722
25R 3,991,724
32EA 3,991,726
3,991,727
32SP 3,991,725
44D 3,991,728
75B 3,991,729
117R 3,991,730
119F 3,991,731
140R 3,991,732
148E 3,991,733
179E 3,991,734
195C 3,991,735
197R 3,991,736

CLASS 126
21A 3,991,737
200 3,991,738
268 3,991,739
270 3,991,740
271 3,991,741
3,991,742

CLASS 128
1R 3,991,743
2H 3,991,744
2S 3,991,745
3,991,746
2.06B 3,991,748
2.06R 3,991,747
23R 3,991,749
36 3,991,751
79 3,991,752
146.2 3,991,753
156 3,991,754
172.1 3,991,755
214R 3,991,756
216 3,991,757
233 3,991,758
260 3,991,750
3,991,759
3,991,760
266 3,991,761
276 3,991,762
278 3,991,763
303.1 3,991,764
305 3,991,765
335.5 3,991,766
348 3,991,767

350V 3,991,768
372 3,991,769
413 3,991,770

CLASS 131

134 3,991,771
138 3,991,772
264 3,991,773

CLASS 132

48R 3,991,774
79C 3,991,775
84R 3,991,776
88.7 3,991,777

CLASS 133

8R 3,991,778

CLASS 134

16 3,992,221
57R 3,991,779

CLASS 135

66 3,991,780

CLASS 136

227 3,992,229

CLASS 137

15 3,991,781
15.1 3,991,782
209 3,991,783
458 3,991,784
494 3,991,785
561R 3,991,786
596.13 3,991,787
608 3,991,788
624.2 3,991,789
819 3,991,790

CLASS 138

94 3,991,791
108 3,991,792

CLASS 139

79 3,991,793
196.3 3,991,794
384B 3,991,795

CLASS 140

124 3,991,796

CLASS 141

91 3,991,797

CLASS 144

28.1 3,991,798
34R 3,991,799
208E 3,991,800

CLASS 148

6.3 3,992,230
143 3,992,231
175 3,992,232
3,992,233

CLASS 150

3 3,991,801

CLASS 152

210 3,991,802
361R 3,991,803
427 3,991,804

CLASS 156

13 3,992,234
3,992,235
83 3,992,236
86 3,992,237
93 3,992,238
133 3,992,239
250 3,992,240
272 3,992,241
289 3,992,242
521 3,992,243
3,992,244
571 3,992,245

CLASS 159

1S 3,992,246
47R 3,992,247

CLASS 160

22 3,991,805
90 3,991,806
113 3,991,807

CLASS 162

17 3,992,248
72 3,992,249
88 3,992,250
164EP 3,992,251
266 3,992,252
290 3,992,253
300 3,992,254

CLASS 164

4 3,991,808
35 3,991,809
57 3,991,810
59 Re.29,035
121 3,991,811
200 3,991,812
259 3,991,813
278 3,991,814
281R 3,991,815

CLASS 165

1 3,991,816
3,991,817
8 3,991,818
29 3,991,819
103 3,991,821
111 3,991,820
140 3,991,822
145 3,991,823

CLASS 166

.5 3,991,824
68 3,991,825
120 3,991,826
253 3,991,827
261 3,991,828

CLASS 169

19 3,991,829

CLASS 172

180 3,991,830
198 3,991,831
804 3,991,832

CLASS 173

20 3,991,833
73 3,991,834
134 3,991,835

CLASS 174

15WF 3,992,565
42 3,992,566
73R 3,992,567
84S 3,992,568
92 3,992,569
135 3,992,570

CLASS 175

4.6 3,991,836
27 3,991,837
210 3,991,838

CLASS 176

36C 3,992,255
3,992,257
40 3,992,256
67 3,992,258
78 3,992,259

CLASS 177

40 3,991,839
210 3,991,840
225 3,991,841

CLASS 178

6 3,992,571
3,992,572
6.5 3,992,573
6.6DD 3,992,574
3,992,576
6.6R 3,992,575
7.3D 3,992,577
7.8 3,992,578
18 3,992,579
69.5R 3,992,580
70R 3,992,581

CLASS 179

1AT 3,992,584
3,992,586
1C 3,992,583
1J 3,992,582
1R 3,992,585
2C 3,992,587
6.3R 3,992,588
15BT 3,992,590
15FS 3,992,589
16F 3,992,591
18FF 3,992,592
100.3V 3,992,593
170.6 3,992,594

CLASS 180

1VS 3,991,842
33C 3,991,843
68.5 3,991,844
77R 3,991,845
132 3,991,846
135 3,991,847

CLASS 181

33G 3,991,848
33H 3,991,849
102 3,991,850

CLASS 182

86 3,991,851
169 3,991,852
187 3,991,853

CLASS 184

1.5 3,991,854
12 3,991,855

CLASS 187

1R 3,991,856
18 3,991,857
61 3,991,858

CLASS 188

71.9 3,991,859
73.6 3,991,860
79.5P 3,991,861
282 3,991,862
289 3,991,863

CLASS 192

105BA 3,991,864
109F 3,991,865

CLASS 193

2R 3,991,866

CLASS 194

102 3,991,867

CLASS 195

11 3,992,260
31R 3,992,261
66R 3,992,262
80R 3,992,263
3,992,264
127 3,992,265

CLASS 197

1R 3,991,868
3,991,869
3,991,870
3,991,871
53 3,991,872
3,991,873
91 3,991,874
127R 3,991,875

CLASS 198

335 3,991,877
831 3,991,876

CLASS 200

11TC 3,992,595
60 3,992,596
61.39 3,992,597
81.9M 3,992,598
144R 3,992,599
153R 3,992,600
295 3,992,601

CLASS 201

8 3,992,266

CLASS 204

1T 3,992,267
30 Re.29,039
72 3,992,268
77 3,992,269
113 3,992,270
129 3,992,271
147 3,992,272
158R 3,992,273
3,992,274
3,992,289
159.15 3,992,275
159.16 3,992,276
172 3,992,277
242 3,992,278
288 3,992,279
290F 3,992,280

CLASS 206

203 3,991,879
431 3,991,880
439 3,991,881

CLASS 208

45 3,992,281
46 3,992,282
59 3,992,283
108 3,992,284
208R 3,992,285

CLASS 209

1 3,992,286
2 3,992,287
3 3,992,288
73 3,991,882
3,991,883

CLASS 210

23H 3,992,301
23R 3,992,290
3,992,291
30A 3,992,292
48 3,992,293
58 3,992,294
63R 3,992,295
90 3,992,296
104 3,992,297
141 3,992,298
152 3,992,299
167 3,992,300
321B 3,992,302

CLASS 211

1.5 3,991,884

CLASS 214

1BV 3,991,885
1MS 3,991,886
2.5 3,991,887
8.5A 3,991,888
38B 3,991,889
131A 3,991,890
142 3,991,891
152 3,991,892
3,991,893
302 3,991,894

CLASS 215

211 3,991,895
227 3,991,896
230 3,991,897

CLASS 219

91 3,992,602
136 3,992,603
227 3,992,604
233 3,992,605
243 3,992,606
314 3,992,607
336 3,992,608
532 3,992,609

CLASS 220

9D 3,991,898
15 3,991,899
219 3,991,900
269 3,991,901
324 3,991,902
327 3,991,903
334 3,991,904
343 3,991,905

CLASS 221

73 3,991,906
84 3,991,907
154 3,991,908
214 3,991,909

CLASS 222

1 3,991,910
25 3,991,911
89 3,991,912
156 3,991,913
321 3,991,914
394 3,991,915
402.13 3,991,916
486 3,991,917
527 3,991,918

CLASS 223

39 3,991,919
111 3,991,920

CLASS 224

4D 3,991,921

CLASS 225

17 3,991,922
20 3,991,923
100 3,991,924

CLASS 227

10 3,991,925
21 3,991,926

CLASS 228

41 3,991,927
110 3,991,933
190 3,991,928
208 3,991,929
263 3,991,930

CLASS 229

8 3,991,931
35 3,991,932

CLASS 232

46 3,991,934

CLASS 233

23R 3,991,935

CLASS 235

61T 3,992,610
92EV 3,992,611
150.27 3,992,613
150.3 3,992,612
151.1 3,992,614
151.32 3,992,615
156 3,992,616
181 3,992,617

CLASS 237

1A 3,991,936
3,991,937
3,991,938

CLASS 239

63 3,991,939
430 3,991,940
552 3,991,941
566 3,991,942

CLASS 240

52R 3,992,618

CLASS 241

1 3,991,943
36 3,991,944
55 3,991,945
93 3,991,946
169.1 3,991,947
175 3,991,948

CLASS 242

4BE 3,991,949
18DD 3,991,950
55.53 3,991,878
56.9 3,991,952
78.6 3,991,951
107.4A 3,991,953
150M 3,991,954
192 3,991,955
199 3,991,956

CLASS 244

102R 3,991,957

CLASS 246

34R 3,991,958

CLASS 248

49 3,991,959
68R 3,991,960
99 3,991,961
188.5 3,991,962
262 3,991,963
354R 3,991,964
406 3,991,965
444 3,991,966
448 3,991,967
501 3,991,968

CLASS 249

20 3,991,969
106 3,991,970
141 3,991,971

CLASS 250

203R 3,992,619
205 3,992,620
207 3,992,621
214C 3,992,622
216 3,992,623
273 3,992,624
284 3,992,625
288 3,992,626
312 3,992,627
338 3,992,628
3,992,629
360 3,992,630
365 3,992,631
423R 3,992,632
503 3,992,633
645R 3,992,460

CLASS 251

11 3,991,972
210 3,991,973
306 3,991,974
317 3,991,975

CLASS 252

8.8 3,992,304
33.6 3,992,306
37 3,992,303
46.7 3,992,307
48.2 3,992,308
49.8 3,992,309
59 3,992,310
62.1R 3,992,311
77 3,992,312
149 3,992,313
160 3,992,314
182 3,992,315
3,992,316
186 3,992,317
389A 3,992,318
408 3,992,319
429B 3,992,320
3,992,322
429R 3,992,321
430 3,992,323
439 3,992,324
442 3,992,325
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449 3,992,327
459 3,992,328
463 3,992,329
466J 3,992,330
472 3,992,331
548 3,992,332

CLASS 254

30 3,991,976
71 3,991,977
139 3,991,978
186R 3,991,979

CLASS 256

45 3,991,980
65 3,991,981
3,991,982

CLASS 259

182 3,991,983
195 3,991,984

CLASS 260

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3 3,992,334
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CLASS 271
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94.5M 3,992,681

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189 3,992,085
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285 3,992,526
304 3,992,553

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174.2 3,992,135

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208 3,992,562
219 3,992,563
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D4—	31	242,299		185	242,319			242,333	D19—	26	242,343			242,362		3	242,381
D6—	4	242,303		251	242,320	D11—	29	242,377		64	242,344		G	242,360	D56—	1E	242,383
		242,304	D7—	128	242,300		90	242,376		90	242,345		R	242,359		2	242,384
	45	242,305		130	242,301		125	242,363	D22—	7	242,346	D32—	2C	242,365		4B	242,385
		242,306		154	242,302		160	242,364		27	242,347	D34—		242,366	D83—	1D	242,389
	47	242,307	D8—	6	242,321	D12—	1	242,334			242,348		R	242,367		S	242,390
	65	242,308		131	242,322			242,335			242,349			242,368		V	242,388
	69	242,309		264	242,323		53	242,336	D23—	17	242,351		4	242,373		12A	242,391
		242,310	D9—	52	242,324		60	242,337		19	242,350		5GP	242,369		R	242,392
	99	242,311		178	242,325		73	242,338		35	242,352			242,372			242,393
		242,312		224	242,326		182	242,339		72	242,353		SS	242,371			242,396
	132	242,313		290	242,327			242,340		127	242,354		N	242,370			242,397
	134	242,314	D10—	15	242,328		187	242,341		153	242,355		13R	242,374			242,398
		242,315		57	242,329	D15—	89	242,387	D26—	5C	242,356		15AF	242,375	D87—	5G	242,394
	137	242,316		91	242,330		123	242,382			242,357	D48—	16D	242,378		8	242,395
	162	242,317			242,331			242,386		14A	242,358			242,379			

CLASSIFICATION OF PLANTS

P. —	24	3,975	P. —	43	3,973	P. —		3,977	P. —	48	3,981	P. —		3,980	P. —		3,982
P. —	35	3,974	P. —		3,976	P. —		3,978	P. —	49	3,979						

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PATENTS

1 : 3,991,695	3,991,750	3,992,584	3,991,928	3,992,107	3,992,137
3,992,327	3,991,759	3,992,593	3,992,002	3,992,297	3,992,173
2 : 3,992,348	3,991,766	3,992,596	3,992,066	3,992,587	3,992,212
4 : 3,991,567	3,991,767	3,992,598	3,992,080	15 : 3,992,123	3,992,216
3,991,625	3,991,775	3,992,605	3,992,126	3,992,186	3,992,222
3,992,147	3,991,776	3,992,613	3,992,249	3,992,187	3,992,224
3,992,611	3,991,777	3,992,619	3,992,259	3,992,190	3,992,257
3,992,690	3,991,830	3,992,620	3,992,388	16 : 3,992,021	3,992,268
5 : 3,992,130	3,991,860	3,992,628	3,992,394	17 : Re.29,037	3,992,282
3,992,507	3,991,896	3,992,629	3,992,429	3,991,439	3,992,283
6 : Re.29,036	3,991,900	3,992,630	3,992,439	3,991,444	3,992,284
3,991,423	3,991,917	3,992,631	3,992,441	3,991,456	3,992,285
3,991,469	3,991,924	3,992,632	3,992,488	3,991,493	3,992,303
3,991,473	3,991,939	3,992,669	3,992,506	3,991,524	3,992,322
3,991,478	3,991,969	3,992,685	3,992,517	3,991,527	3,992,323
3,991,497	3,991,972	3,992,686	3,992,538	3,991,543	3,992,349
3,991,514	3,991,991	3,992,691	3,992,586	3,991,568	3,992,375
3,991,517	3,991,997	3,992,692	3,992,623	3,991,571	3,992,418
3,991,521	3,992,000	3,992,693	3,992,633	3,991,599	3,992,423
3,991,532	3,992,001	3,992,699	10 : 3,991,481	3,991,616	3,992,435
3,991,536	3,992,005	3,992,703	3,991,715	3,991,620	3,992,451
3,991,552	3,992,011	8 : 3,991,445	3,992,144	3,991,633	3,992,453
3,991,554	3,992,013	3,991,790	3,992,145	3,991,640	3,992,464
3,991,555	3,992,025	3,991,873	3,992,198	3,991,690	3,992,469
3,991,574	3,992,043	3,991,910	3,992,325	3,991,703	3,992,470
3,991,589	3,992,045	3,992,114	3,992,345	3,991,724	3,992,471
3,991,596	3,992,048	3,992,169	3,992,369	3,991,732	3,992,474
3,991,609	3,992,057	3,992,491	3,992,450	3,991,740	3,992,476
3,991,611	3,992,072	3,992,497	11 : 3,991,967	3,991,763	3,992,518
3,991,614	3,992,087	3,992,505	12 : 3,991,475	3,991,787	3,992,550
3,991,626	3,992,094	3,992,655	3,991,486	3,991,791	3,992,555
3,991,630	3,992,095	9 : 3,991,426	3,991,498	3,991,808	3,992,556
3,991,649	3,992,105	3,991,438	3,991,507	3,991,810	3,992,565
3,991,659	3,992,115	3,991,441	3,991,515	3,991,812	3,992,603
3,991,665	3,992,141	3,991,464	3,991,575	3,991,831	3,992,608
3,991,674	3,992,227	3,991,488	3,991,673	3,991,842	3,992,610
3,991,677	3,992,290	3,991,489	3,991,720	3,991,847	3,992,644
3,991,679	3,992,301	3,991,500	3,991,773	3,991,905	3,992,674
3,991,682	3,992,307	3,991,539	3,991,822	3,991,908	18 : Re.29,035
3,991,685	3,992,319	3,991,562	3,991,980	3,991,915	3,991,558
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3,991,694	3,992,402	3,991,686	3,992,523	3,991,920	3,991,764
3,991,702	3,992,425	3,991,687	3,992,588	3,991,975	3,991,818
3,991,707	3,992,430	3,991,699	3,992,616	3,991,994	3,991,973
3,991,716	3,992,447	3,991,704	3,992,718	3,992,006	3,992,015
3,991,717	3,992,454	3,991,706	13 : 3,991,428	3,992,035	3,992,128
3,991,719	3,992,486	3,991,848	3,991,660	3,992,044	3,992,199
3,991,736	3,992,541	3,991,849	3,991,814	3,992,051	3,992,215
3,991,742	3,992,558	3,991,881	3,991,853	3,992,070	3,992,266
3,991,744	3,992,569	3,991,901	3,991,986	3,992,121	3,992,377
3,991,747	3,992,573	3,991,914	3,992,023	3,992,125	3,992,378

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PLANT PATENTS

6 :	3,973	3,977	3,979	3,981	18 :	3,975	41 :	3,974
6 :	3,976	3,978	3,980	3,982				

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U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*